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Archaeological Investigations at the Peninsula Site, 35KL87, Gerber Reservoir, South-Central Oregon

Jon Massoglia Silvermoon

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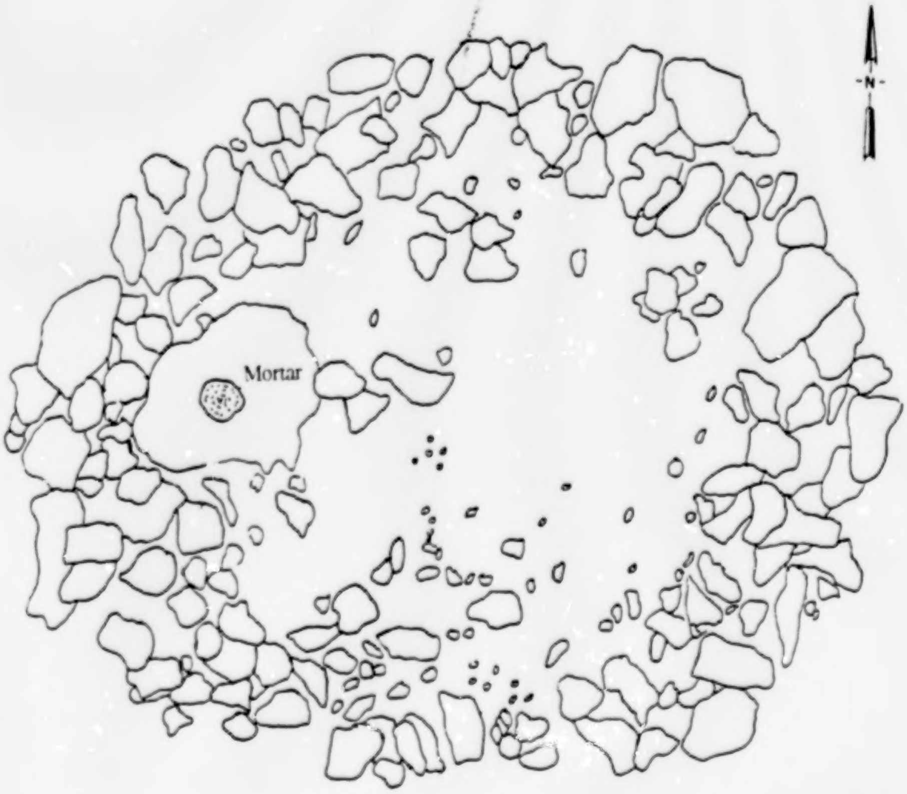

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ARCHAEOLOGICAL INVESTIGATIONS AT THE PENINSULA SITE, 35KL87, GERBER RESERVOIR, SOUTH-CENTRAL OREGON

By

Jon Massoglia Silvermoon

Report to

Lakeview District, Bureau of Land Management
on the 1986 University of Oregon
Archaeological Field School Excavations

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ABSTRACT

Located in south-central Oregon along the shores of Gerber Reservoir, the Peninsula Site, 35KL87, was test excavated during the summer of 1986 by the University of Oregon Archaeological Field School. Circular rock features observed at the site were found to be habitation structures. Radiocarbon dates and typological comparisons with other sites in the region suggest that the site's occupational history spans the last 4,000 to 5,000 years ago.

The evidence of artifacts and cultural features as well as the biotic setting of the site indicates plant and animal food processing took place at the site and a high degree of sedentism was characteristic of the prehistoric inhabitants. The presence of tools that apparently were used in the manufacture of mortars and metates is an apparently unique feature of the site. Rock art of Great Basin Curvilinear Abstract Style co-occurs with grinding features. This is suggestive of an association between the rock art and its motifs and the activities of women.

Present evidence suggests that the site was both a winter and summer village between 4,000 and 1,000 B.P. and that sometime between 2,000 and 1,000 B.P. use as a summer village intensified. Occupation appears to have continued to just before historic contact, although use during the winter may have decreased in later years. This intensification of summer use and possible decrease in winter use are seen as related to environmental change, an increased dependence on upland resources, an increased local population, a possible movement of a displaced ancestral Klamath-Modoc population into the area, and a shift in the site's role within a broader geographic-cultural interaction zone as Penutian speaking peoples abandoned the northwestern Great Basin and its greatly diminished lake-marsh ecosystems. Recommendations are given for testing this and two alternate hypotheses.

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PREFACE AND ACKNOWLEDGMENTS

The Peninsula Site, 35KL87, was test excavated during the summer of 1986 by the University of Oregon Archaeological Field School under a contract with the United States Department of the Interior (USDI) Bureau of Land Management (BLM) Lakeview District. The field records and collection from this site are stored at the Oregon State Museum of Anthropology under accession number 626. This accession number also includes field records and collections from the survey of two proposed BLM timber sales east of the site. Dr. C. Melvin Aikens was Principal Investigator for the contract with BLM. Jon Massoglia Silvermoon was Director of the project. The purpose of this report, in addition to satisfying contract obligations with the BLM, is to describe the investigations at the Peninsula Site and the results. This report is also intended to serve as a framework for conducting future research at this site and the surrounding area. In addition, this report is a revision of draft submitted to the BLM in 1989.

Many individuals helped with this project. I would particularly like to thank the three students who formed the core of the field crew: Jim Benich, Sean Hess, and John Witherspoon. Their contributions were invaluable. Carla Burnside was Assistant Director for the 1986 field season. A number of visitors also assisted with the fieldwork. I thank all of them including Phil Young, Kathryn Madden, Ethan Kegley, Scott Huffman, and Linnea Huffman from Eugene; Sylvia Gerber and two of her children from the local area; Oralia Arizola and Lisa Wales from the BLM's Klamath Falls office; and Richard Bland and several volunteers from the Klamath National Forest.

I would also like to convey my appreciation to the Klamath tribal officials with whom we met prior to beginning excavations at the Peninsula Site. John Witherspoon helped greatly in making contact and talking with these officials. Special appreciation is expressed to BLM Lakeview District Archaeologist Bill Cannon and Steve Sherman of the Klamath Falls BLM for their assistance and support. Thanks are also extended to the BLM fire crew stationed at Gerber Reservoir. As for our local hosts, Edward and Marilyn Livingston, any words I could write would be insufficient to convey the gratitude they deserve. I would also like to thank Orville de Vaul for the lengthy conversation we had concerning the pre-reservoir history of the area. Thanks are also expressed to the people of Bonanza.

I would like to convey my gratitude to a number of people who helped me with the data analysis and preparation of this report. Eric Bergland's insight greatly aided in my analysis of ground stone and basalt cobble tools. Lee Spencer also offered a

number of helpful suggestions. Wyndeth Moisan rescued me with her drawings of the ground stone and cobble artifacts. Jim Bryant of the U.S. Bureau of Reclamation's Klamath Falls office provided a very helpful map of the reservoir basin. Gratitude is also expressed to Bill Loy for his guidance in the preparation of maps and to the staff of the map library at the University of Oregon. Thanks also to Jay King and Biosystems Analysis, Inc. for their expeditious analysis of obsidian samples and to Craig Skinner for his help in interpreting the results of that analysis. The obsidian analysis was partially funded by a much appreciated grant from the archaeological trust fund administered by the University of Oregon's Department of Anthropology.

Thanks also to Pam Endzweig of the Oregon State Museum of Anthropology for help in locating site forms. The staff and faculty of the Department of Anthropology, University of Oregon, also deserve thanks. Dr. Don E. Dumond provided useful statistical references. Joyce Smith typed the oral history transcript from three hours of tape. Chris Stole helped with necessary coordination with the department. Janet Mikesell helped us keep our finances in order. Clarice Jeppesen aided in the final months of report preparation. Deep gratitude is also expressed to Mel Aikens for his help particularly in editing this report. Appreciation is also given to Rick Pettigrew for reviewing a draft of this report, Lynne Ertle for reviewing the final report prior to submission to the BLM, to Deborah Garwood for helping me prepare the collection for curation, and to Dennis Jenkins for sharing recent research in the Fort Rock Basin.

Sincere appreciation is also given to my parents who instilled in me the qualities and motivations of a scientist and an inquiring mind. Thanks also to Kathryn, Ethan, and Camas. Special thanks to Judy for her patience as I prepared this report for publication.

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1. INTRODUCTION

The Peninsula Site, 35KL87, was test excavated during the summer of 1986 by the University of Oregon Field School under contract with the Bureau of Land Management (BLM) Lakeview District. Dr. C. Melvin Aikens was Principal Investigator. This report describes work undertaken at the Peninsula Site and the findings. It also serves as a framework for future research at the site and surrounding region.

The primary purpose of the 1986 excavations was to evaluate the Peninsula Site in light of its disturbance by artifact collectors and the desire of the BLM to develop a management plan for the protection of archaeological resources in the Gerber Reservoir area. Three main goals and several attendant objectives provided the focus of the fieldwork. These include the following:

1. Determination of the site's size and condition, including
    a. integrity and the extent of disturbance;
    b. horizontal extent or boundaries;
    c. vertical extent or depth; and,
    d. density of cultural material.

2. Determination of the range of cultural debris present at the site with attention to:
    a. the total site area and
    b. intrasite variation.

3. Determination of the site's potential to yield information relevant to the general area's prehistory including the potentials for:
    a. floral and faunal analysis;
    b. dating and lithic sourcing;
    c. intrasite features and stratigraphy;
    d. the definition of cultural components;
    e. improving regional culture history; and,
    f. answering research questions important in the region.

A number of research issues and questions helped guide the fieldwork and subsequent analysis. These included the following:

1. What was the nature of the circular rock features found at the Peninsula Site and throughout much of the northern Great Basin? Did these represent summer or winter dwellings? How do these features relate to house-type variability and winter village locations evident in the regional ethnographic and archaeological records?

2. What was the nature of the aboriginal use of "uplands" in the territory of the ethnographic Modoc? In particular, how did the availability and density of resources affect the degree of sedentism or mobility of aboriginal populations in this area?

3. What were the factors involved in the apparent retreat of marsh-adapted Penutian speakers from the northwestern Great Basin into adjacent montane areas about 1,100 B.P.? How did this retreat affect the aboriginal populations of these montane areas?

This report is organized in the following manner. After this Introduction are reviews of the environment, ethnography, and archaeology of south-central Oregon and the Gerber Reservoir vicinity. This material is presented both to provide a framework in which to place the Peninsula Site and to assist in future research in this area. These reviews are followed by a description of the methods used in field work and data analysis.

The results of the 1986 test excavations are presented next. Rock features and rock art are addressed first, then the organic remains and lithic artifacts recovered from the site. Next the results of obsidian hydration and x-ray fluorescence analyses are discussed. Finally, a discussion, summary and synthesis of the background material and site data are presented. Selected site photographs are included in an appendix. A brief report on the preliminary results of the 1986 timber sale surveys and the 1987 excavations at the Peninsula Site is also included in an appendix.

2. ENVIRONMENTAL BACKGROUND

The Peninsula Site, 35KL87, is located in south-central Oregon at an elevation of approximately 1,477 m (4,845 ft) on the shores of Gerber Reservoir (Figure 1). The reservoir, created when Gerber Dam was built in 1923, covers 1,538 hectares (3,800 acres) and has a capacity of 116 cubic hectometers (94,000 acre feet) (Loy 1976:172). Most land in the immediate vicinity of the Peninsula Site is under the jurisdiction of the USDI Bureau of Land Management. Higher elevation forested areas in the vicinity are under the jurisdiction of the USDA Forest Service.

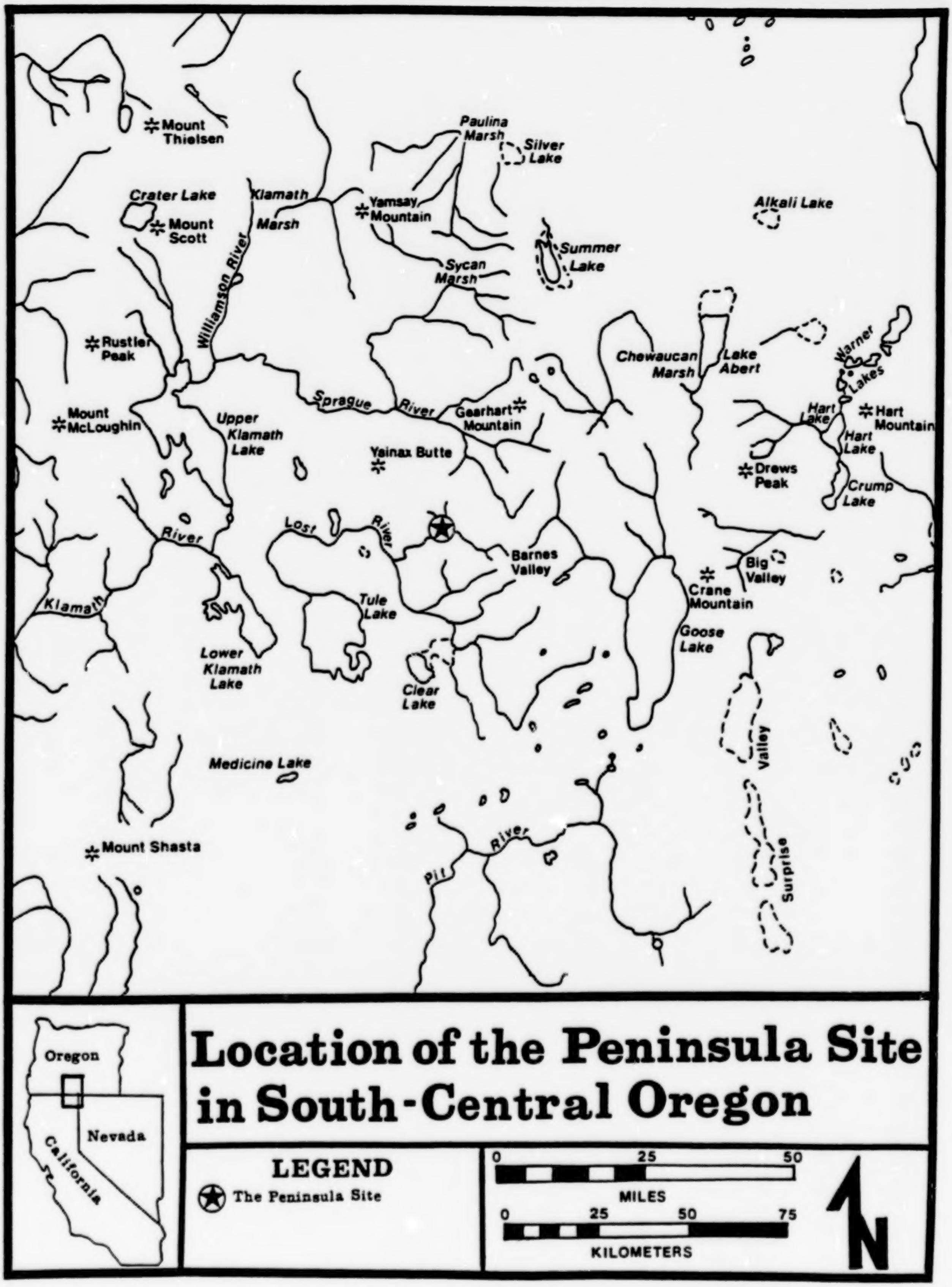
This section of the Peninsula Site report presents basic environmental information concerning the physiography, hydrology, geology, and climate of this part of Oregon along with a description of the flora and fauna. In addition, available information concerning prehistoric environmental dynamics is presented with discussions concerning glaciation, pluvial lakes, volcanic and tectonic activity, and prehistoric flora and fauna. Finally, based on the environmental information presented, a reconstruction is made of the pre-contact environment and setting of the Peninsula Site area. The information presented in this environmental background section is also designed to assist in future analysis of site formation processes, identification of floral and faunal remains that may be found during future site excavations, and an assessment of the resources within the site's catchment area.

PHYSIOGRAPHY, HYDROLOGY, AND GEOLOGY

The Gerber Reservoir area lies within the Basin and Range Physiographic Province, which is characterized by northwest-trending fault block mountains with intervening flat valleys blanketed with alluvium. Generally this province has interior drainage with short streams flowing into low lakes and playas. The reservoir itself is within the Miller Creek subdrainage of the Lost River drainage. Riparian areas are found along Miller Creek. Although the Lost River drains into Lower Klamath Lake, under certain conditions the Lost River drainage has an external outlet via the Klamath River. Basin and Range topography generally consists of flat to gently rolling lava plateaus. Slopes range from gentle to moderately steep, although steeper slopes along fault scarps and in narrow drainages are not uncommon. This topography is the result of faulting, eruptive centers, lava flows, bedrock types, and geologic erosion (Wenzel 1979:7).

The province is traversed by block faults. Goodlow and Gerber Rims are examples of steep escarpments resulting from such faulting (Figure 2). Dome shaped landforms with radial drainage patterns are a common volcanic feature in the Gerber Reservoir area, and include Goodlow Mountain, Paddock Butte, and Horsefly Mountain (Wenzel 1979:4,7-8). East and west of the reservoir larger hills, buttes, and rims rise from the basin. To the north and south are broken, rolling, rocky flats (Cannon 1984:5).

Figure 1 Location of Peninsula Site, 35KL87, in South-Central Oregon.



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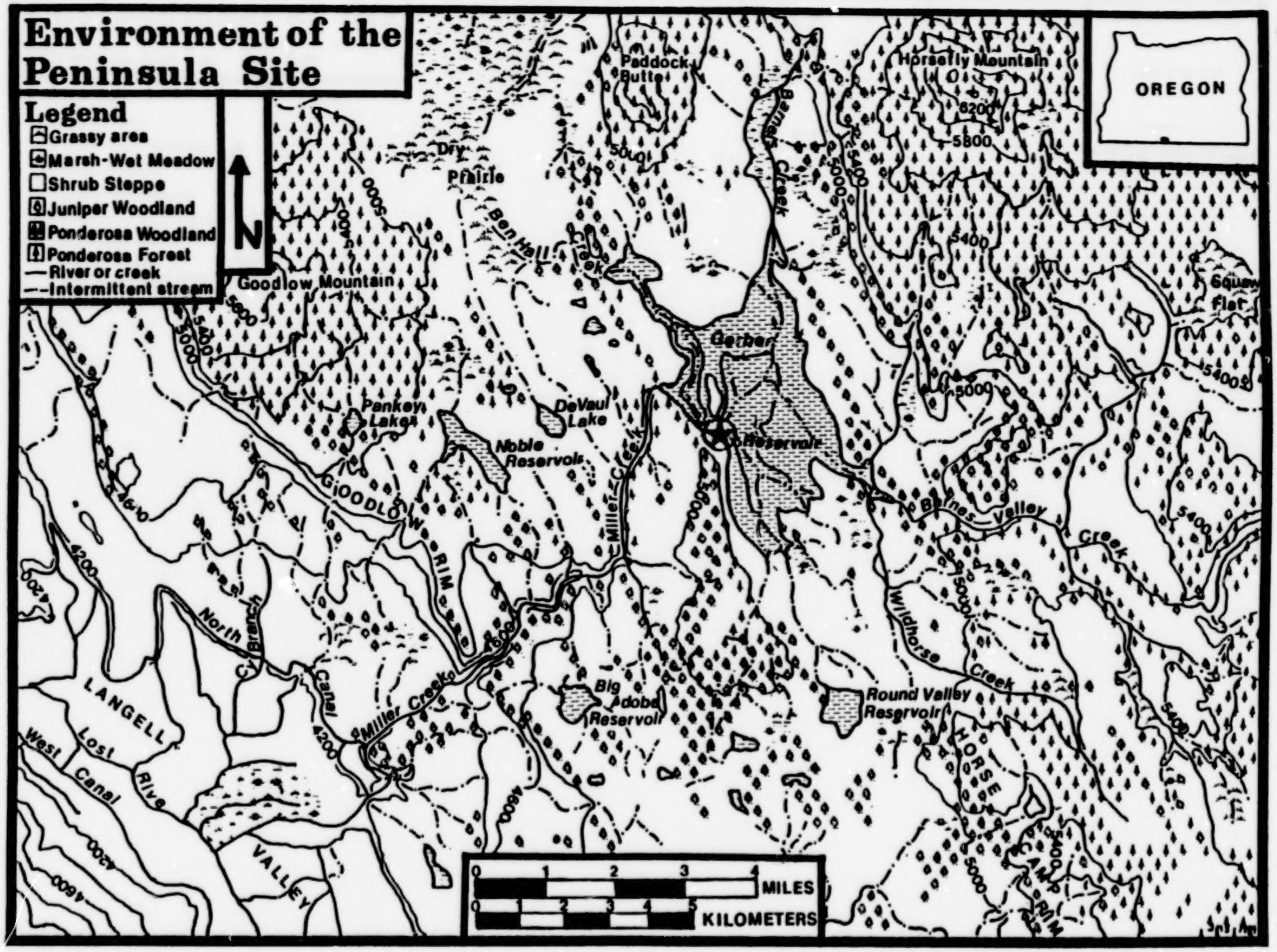

Figure 2 Environment of the Peninsula Site.

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This area also falls within the Basin and Range geologic province. The general geology of the Gerber Reservoir area is a mosaic of alluvial deposits, basalt and tuff flows, and basaltic eruptive centers such as Goodlow Mountain, Paddock Butte, and Horsefly Mountain (Wenzel 1979:4).

The area's watershed is dominated by early-to-mid spring snowmelt. Perennial streams, including Miller Creek and the East Branch of the Lost River, have peak flows in early-to-mid spring and low flows near the end of July. Intermittent streams are usually dry by the end of July and carry water in direct response to precipitation or snowmelt. Ephemeral streams carry water only during high precipitation years.

Prior to the construction of Gerber Dam, Barnes Valley Creek and Barnes Creek, both perennial streams, joined to form Miller Creek in the reservoir's basin. A number of intermittent streams, most notably Ben Hall Creek, also drained into Miller Creek. The entire area has Miller Creek as its outlet into the Lost River drainage. Below the dam, Miller Creek flows through a narrow rimrock canyon toward Lost River, which in turn drains into Lower Klamath Lake. The latter has no permanent exterior outlet to the Pacific Ocean, although sometimes in late winter and spring it overflows into the Klamath River.

Numerous scattered permanent and seasonal ponds, seeps and springs, marshes, and some wet and moist meadows are found in this area. Wetlands range from marshy areas with year-long standing water to seasonally saturated wet meadows.

CLIMATE

The climate of this area is typical of the High Plateau climatic region as delineated by Loy (1976:137), characterized by light precipitation, low relative humidity, rapid evaporation, abundant sunshine, and wide temperature ranges (Wells 1936:4-1). Temperature and precipitation can vary widely over short horizontal distances and rapidly changing vertical distances such as the interfaces at fault scarps and adjacent valleys (Wenzel 1979:9).

The Gerber/Lost River area is in the semiarid rain shadow area east of the Cascade Range where precipitation is light and occurs primarily in the fall (20–25%), winter (30–40%), and spring (25–30%). Dry summers are characterized by intense localized thunderstorms. At Gerber Reservoir, precipitation averages about 35 cm (14 in.) per year. Most of this comes as snow between October and April. Precipitation results primarily from low pressure systems moving in from the Pacific Ocean on the dominant westerly and southwesterly winds (Cannon 1984:5; Franklin and Dyrness 1988:42; Sterns 1974:842, 849, 860; Wenzel 1979:9).

In Loy's (1976:137) High Plateau climatic region summer weather is moderate and winters are long. Annual temperatures may vary through a range of 72.2° C (130° F). The range of normal temperatures between the warmest and coldest months is about 25.0° to 30.6° C (45°

to 55° F), with the average annual minimum temperature ranging between -22.2° and -6.7° C (-8° and 20° F), and the average annual maximum temperature ranging from 12.8° to 21.7° C (55° to 71° F). Mean temperatures for July range from a minimum of 2.2° to 7.8° C (36° to 46° F), to a maximum of 26.7° to 31.1° C (80° to 88° F). For January they range from a minimum of 12.2° to -7.8° C (10° to 18° F), to a maximum of 2.2° to 4.4° C (36° to 40° F). Diurnal temperature ranges may be as much as 10° C (18° F) in midwinter to 26.7° C (48° F) in midsummer. At Gerber Reservoir the average annual temperature range is from below -17.7° C to above 32.2° C (from below 0° F to above 90° F) (Cannon 1984:5; Loy 1976:132; Sterns 1974:856-860; Wells 1936:4-2; Wenzel 1979:9).

FLORA

Within the Gerber Reservoir area are three major forest and steppe province vegetation zones as recognized by Franklin and Dyrness (1988). These include the *Pinus Ponderosa* Zone, a lower elevation forested area; the Shrub-Steppe Zone, dominated by sagebrush; and the *Juniperus Occidentalis* Zone, a savannah-like transitional or ecotonal zone between ponderosa pine forested areas and the sagebrush dominated shrub-steppe (Appendix B, Table B-1).

Ponderosa pine associations are the dominant forest type. In some higher elevation areas of Goodlow and Horsefly Mountains are mixed conifer forest plant associations having ponderosa pine codominant with white fir and/or sugar pine and incense cedar. Lodgepole pine may also occupy areas with cold microclimates, poor soil, or recent burns. Quaking aspen lies along streams, lakes, and in poorly drained areas (Hopkins 1979; USDA Forest Service 1946).

Western juniper grows in some of the drier forested areas with shallow, stony soil, especially in ecotonal areas. In some areas the forest type can be characterized as a ponderosa woodland with scattered stands of ponderosa pine intermixed with juniper and mountain mahogany.

Forests range from relatively open understories to dense stands. Most forested areas were maintained in a "pure" Ponderosa pine community "under a regime of naturally occurring wildfires" before "aggressive fire control" (Hopkins 1979:2).

Understories and forest openings contain a variety of shrubs, grasses, sedges, rushes, and forbs. Shrubs include mountain mahogany, sagebrush, rabbitbrush, bitterbrush, manzanita, ceanothus, huckleberry, snowberry, blue elderberry, plums, chokecherry, twinberry, serviceberry, trailing blackberry, and currant. Forbs include vetch, aster, biscuitroot, balsamroot, strawberry, dandelion, lupines, plantain, and yarrow. Native grasses comprise bottlebrush squirreltail, intermediate wheatgrass, bluebunch wheatgrass, Idaho fescue, mountain brome, giant wildrye, northern meadow barley, Wheeler's bluegrass, and Thurber needlegrass. Introduced grass species are quite extensive and include Kentucky bluegrass, cheatgrass brome, and timothy (Hopkins 1979; Ray 1963).

In the juniper woodland transition areas, big sagebrush is usually the dominant understory shrub, although it is sometimes replaced by or codominant with bitterbrush. Other shrubs and grasses associated with juniper include mountain mahogany, low sagebrush, rabbitbrush, gray horsebrush, granite gilia, Idaho fescue, bluebunch wheatgrass, western needlegrass, Sandberg bluegrass, and bottlebrush squirreltail. Isolated ponderosa pine may be found in more sheltered areas. This zone's savannah-like appearance is due to the openness of shrubs and trees (Hopkins 1979).

Shrub-steppe zone plant associations are usually dominated by low sagebrush on shallow, stony soils, or by big sagebrush in association with a variety of grasses, sedges, and forbs. These associated species include rabbitbrush, spiny hopsage, wax currant, round-leafed snowberry, epos, balsamroot, desert parsley, willow dock, blazing star, sunflower, plain's mustard, lamb's quarter, tarweed, Manna grass, buckwheat, and ryegrass.

At dry rocky sites Sandberg bluegrass and narrowleaf goldenweed, Sanberg bluegrass, onespike oatgrass, bottlebrush squirreltail, and Idaho fescue inhabit low sagebrush communities. Bluebunch wheatgrass or Idaho fescue is usually found with big sagebrush communities. Juniper, ponderosa pine, and mountain mahogany may be present in low densities (Hansen 1947:64–69; Hopkins 1979; Loy 1976:144–145; Ray 1963).

Isolated pockets within the sagebrush dominated shrub-steppe zone can include a desert shrub zone of drought-resistant vegetation including shadscale, Nuttal's saltbush, bud sagebrush, greasewood, spiny hopsage, and various chenopods. Grasses sometimes found in this zone include giant wildrye, creeping wildrye, and alkali saltgrass. This vegetation is usually found in saline settings in playas or along playa margins (Franklin and Dyrness 1988:245; Hansen 1947:69; Loy 1976:144–145).

In moist meadows may also be found tufted hairgrass, camas, white camas, and sedges while wet meadows also have a variety of sedges and rushes. Marsh environments, especially those with shallow standing water, exhibit not only the plants found in moist and wet meadows, but also arrowroot, water-lily or wokas, sago pondweed, widegeon grass, sego lily, burr weed, cattail, and tule (Hopkins 1979; Sampson 1985:12; Ray 1963). Willows populate moist areas along streams and other bodies of water (Hopkins 1979).

The area along the east side of the reservoir is juniper woodland. On the south, west, and north sides ponderosa pine with scattered junipers and a varied understory is present. Meadows are found along drainages that empty into the reservoir and on the reservoir's north and south ends. Rocky flats surround much of the reservoir area (Cannon 1984:5).

FAUNA

The Gerber area falls primarily within the Upper Sonoran and Semiarid Life Zones as described by Bailey (1936). It is on a major axis of the Pacific migratory waterfowl flyway, and numerous bird species are found there (Appendix B, Table B-2). This area and the whole of the Klamath Basin is a major stopover and resting area on this flyway (Loy 1976:169).

Waterfowl in this area include loons, grebes, pelicans, cormorants, herons, egrets, bitterns, swans, geese, ducks, mergansers, coots, and terns. Other bird species dependent on water-related environments in this area include the sandhill crane, the willet, the long-billed curlew, the American avocet, Wilson's phalarope, the Virginia rail, the Sora, the common snipe, and the spotted sandpiper (Loy 1976:162–167; Sampson 1985:169–191).

Land game birds of the area include grouse and quail, and birds of prey include osprey, hawks, eagles, falcons, and owls. The turkey vulture rounds out the large bird species in this area (Loy 1976:162–167; Silovsky 1982).

Smaller birds include doves, swifts, hummingbirds, woodpeckers, sapsuckers, and flickers. Songbirds include the western kingbird, flycatchers, the western wood peewee, the horned lark, swallows, the purple martin, jays, the black-billed magpie, the common raven, chickadees, the plain titmouse, the common bushtit, nuthatches, the brown creeper, the dipper or water ouzel, wrens, the sage thrasher, the American robin, thrushes, bluebirds, Townsend's solitaire, kinglets, the cedar waxwing, the loggerhead shrike, the starling, vireos, warblers, the yellow-breasted chat, the western meadowlark, blackbirds, the northern oriole, the brown-headed cowbird, the western tanager, the black-headed grosbeak, the Lazuli bunting, Cassin's finch, the pine siskin, the red crossbill, the green-tailed towhee, sparrows, and the dark-eyed junco (Loy 1976:162–167; Peterson 1961; Sampson 1985:169-191 Silovsky 1982).

Only four amphibian species inhabit this area: the long-toed salamander, the western toad, the Pacific tree frog, and the spotted frog (Appendix B, Table B-3). The sagebrush lizard, western fence lizard, short-horned lizard, and western skink are also found here. Snakes include the racer, the striped whipsnake, the gopher snake, the common garter snake, the western terrestrial garter snake, the rubber boa, and the western rattlesnake. Eels and fish found in the Klamath Basin and in the general area of Gerber Reservoir and the Lost River include lampreys, trout, chubs, sculpins, suckers, the brown bullhead, the speckled dace, the pumpkin seed, the blue-gilled sunfish, and the largemouth bass (Loy 1976:158–161).

Fur-bearing carnivores include the marten, mink, ermine, and longtail weasel. Other carnivores include the coyote, bobcat, and mountain lion. Black bear and pika are also present as are pronghorn antelope, mule deer, and Roosevelt elk (Loy 1976:154–157; Silovsky 1982). Domesticated dogs were kept by the Modoc (Ray 1963).

The Gerber Reservoir area is used by the Interstate deer herd as summer and transition range. In 1980 about 6,600 adult deer were in the Klamath County portion of the Interstate mule deer management area. About 4,900 deer overwintered in this area that same year (USDA Forest Service 1980). Antelope are also common (Cannon 1984:5).

Five animal species have been extirpated from this area. These include the gray wolf, river otter, bighorn sheep, lynx, and grizzly bear (Silovsky 1982). Isolated historic sightings of bison have been documented for areas east of Goose Lake (Bailey 1936).

PREHISTORIC ENVIRONMENTAL DYNAMICS

Antevs (1948, 1955) and Hansen (1947) developed a threefold sequence of post-Pleistocene climates for the nearby Great Basin including an early cool and moist period followed by a warm and dry period and then a return to a slightly cooler and moister period similar to that experienced today. Antevs termed these periods the Anathermal, Altithermal, and Medithermal, and dated them from 9,000 to 7,000 B.P. (before present), 7,000 to 4,500 B.P., and 4,500 B.P. to the present, respectively.

Later archaeological and paleoenvironmental research by Aschmann (1958), Bryan and Gruhn (1964), Baumhoff and Heizer (1965), O'Connell and Hayward (1972), O'Connell and Ericson (1974), Swanson and Muto (1975), Grayson (1973, 1976), Mehringer (1977), and Sampson (1985) suggests that Antev's scheme is accurate only in the grossest sense. Basic objections include the recognition that there was considerable regional variation in both time and space and that correlations between temperature and moisture were not as Antevs thought.

At Nightfire Island on Lower Klamath Lake, Sampson (1985) and Sampson and Greenspan (1985:193-201) developed a 7,000 year climatic sequence based on stratigraphy, radiocarbon dates, obsidian hydration relative dating, pollen samples, mammalian faunal remains, avifauanal remains, fish remains, and correlations with a bristlecone pine climatic sequence. The latter was developed by LaMarche (1973, 1974) for the White Mountain area of California about 500 km (310 mi) to the south. The general picture for Nightfire Island is a 7,000 year sequence of short-term climatic fluctuations of from 100 to 1,000 years. Temperature and moisture varied independently of each other with warm and dry periods, warm and wet periods, cool and dry periods, cool and moist periods, and cool and wet periods (Table 1).

Gerber Reservoir is a few hundred meters higher in elevation than Nightfire Island and is also further north. While the area may have experienced climatic fluctuations similar in scale and intensity to those of Nightfire Island, it does not automatically follow that the specific conditions were identical for particular time periods. In addition, considering its higher elevation, it is likely that conditions at the Peninsula Site may have been generally somewhat moister than at Nightfire Island.

Glaciation

Four late and postglacial episodes have been identified in the southern Cascades: the late Pleistocene Waban at 13,000 B.P., Zephyr Lake at 9,400 B.P., the Holocene Neoglacial I at about 2,000 B.P., and the Neoglacial II since about 500 B.P. (Carver 1972:51). During the

Table 1 Temperature and effective moisture sequence for Nightfire Island (Sampson 1985; Sampson and Greenspan 1985:193-201).

Time Period		Temperature	Moisture
5,300-4,900 B.C.	7,250-6,850 B.P.	cool	moist
4,800-4,450 B.C.	6,750-6,400 B.P.	warm	dry
4,450-3,750 B.C.	6,400-5,700 B.P.	warm	dry
3,500-3,000 B.C.	5,450-4,800 B.P.	warm	moist
3,000-2,850 B.C.	4,950-4,800 B.P.	warm	dry
2,850-2,450 B.C.	4,800-4,400 B.P.	cool	moist
2,450-2,100 B.C.	4,400-4,050 B.P.	warm	wet
2,100-1,900 B.C.	4,050-3,850 B.P.	warm	dry
1,900-1,700 B.C.	3,850-3,650 B.P.	warm	dry
1,700-1,600 B.C.	3,650-3,550 B.P.	cold	dry
1,600-1,200 B.C.	3,550-3,150 B.P.	hot	dry
1,200-700 B.C.	3,150-2,650 B.P.	cool	dry
700-300 B.C.	2,650-2,250 B.P.	cool	wet
300 B.C.-A.D. 100	2,250-1,850 B.P.	warm	wet
A.D. 100-200	1,850-1,750 B.P.	warm	dry
A.D. 300-400	1,650-1,450 B.P.	warm	wet
A.D. 500-700	1,450-1,250 B.P.	cool	wet
A.D. 900-1200	1,050-750 B.P.	cool	dry
A.D. 1300-1400	650-550 B.P.	cool	wet

late Pleistocene glaciation was extensive on the Sierra and Cascade ranges while less extensive glaciation is evidenced for isolated areas north of Gerber Reservoir including Gearhart and Yamsay mountains and Deadhorse Rim (Bentley 1974:224 ; Blackwelder 1931; Crandall 1965:348; Peterson and McIntyre 1970:22). Yamsay Mountain was glaciated above 2,400 m (7,870 ft), and large glaciers were present at Gearhart Mountain (Bentley 1974:223; Crandall 1965:348). At the end of the Pleistocene southern Cascade glaciers rapidly retreated and snowlines were raised by as much as 1,000 m (3,200 ft) by the time postglacial climates became established (Carver 1972:43, 72). During Neoglacial times glaciation occurred down to about 2,000 m (6,400 ft) (Carver 1972:46). This southern Cascade glacial record suggests that in the Gerber Reservoir vicinity some long-lasting snow fields may have been present periodically in the higher elevation areas of Goodlow and Horsefly Mountains during Pleistocene and Neoglacial times.

Pluvial Lakes

Glaciation was accompanied by the rise of pluvial lakes, which were quite extensive throughout the Great Basin and Klamath Basin. During the late Pleistocene these included pluvial Fort Rock Lake, pluvial Lake Chewaucan, enlarge Goose and Warner lakes, Alkali Lake, and pluvial lakes in the Sycan and Klamath marshes and along the Sycan and Sprague rivers (Allison 1979, 1982:64; Hansen 1947:18; Loy 1976:121; Morrison 1965:266). The Langell Valley was part of pluvial Lake Modoc along with Upper and Lower Klamath lakes, Tule Lake, the Swan Lake Basin, Yonna Basin, and Poe Valley (Dicken and Dicken 1985:1–2, 1-3). Some small pluvial lakes probably existed in the Gerber Reservoir area during late Pleistocene times as evidenced by several lake-derived soils mapped by Wenzel (1979:22–23, 29, 31) south of Yainax Butte and north of Gerber Reservoir.

As post-Pleistocene weather conditions became warmer, and with less effective moisture, pluvial lakes became smaller. Whether they completely disappeared is a matter of contention. Weide (1976:178) suggests "hydrologic conditions sufficient to maintain extensive marshlands" have exited since 7,000 B.P. in areas that had pluvial lakes. Hansen's (1947:122) assertion that Lower Klamath Lake became desiccated was challenged by Grayson's (1976:92) conclusion drawn from the Nightfire Island avifauna that lake levels were "relatively higher" during the late Altithermal.

Sampson (1985) found that during the last 7,000 years the Nightfire Island area and Lower Klamath Lake experienced differing environmental conditions ranging from grasslands to marsh to lake conditions. These correlate with the climatic sequence developed for this area (Table 1). It is likely that a similar pattern was experienced by the Gerber Reservoir area although the area probably was not a lake environment by the Altithermal, but rather shifted through dry grassland, moist and wet meadow, and marsh and pond conditions. Allison (1982:70–71) defined a Neopluvial period for the time between 4,000 and 2,000 B.P. This period is contemporaneous with the Neoglaciation.

Volcanic and Tectonic Activity

Most volcanic activity in the northwest Great Basin had ceased by early Pleistocene times. However, some activity continued north of the Gerber Reservoir area in northwestern Lake County (Peterson and McIntyre 1970:21–22). To the west the explosive eruption of Mount Mazama and the formation of Crater Lake has been dated to about 7,000 B.P., and Newberry Volcano to the north has an extensive record of eruptive activity and lava flows from 6,400 to 1,200 B.P. (Kittleman 1973:2958, 2976). The Glass Mountain obsidian flow in the Medicine Lake highlands to the south has been dated to 1360 B.P. (Chesterman 1955).

The northwest Great Basin has also been tectonically active throughout the Quaternary (Carver 1972:14). Faulting in the Summer Lake area has persisted from the late Pliocene or early Pleistocene to recent times (Dornath 1958:45). Pleistocene faulting along the east side of Klamath Lake has also been reported (Baldwin 1981:122). Davis (1982:72) suggests that tectonic activity may have been more important than climatic change in determining postpluvial resource availability.

Prehistoric Flora

During glacial-pluvial conditions higher elevations shifted into the Canadian Life Zone and white fir, grand fir, Douglas fir, western white pine, western hemlock, and mountain hemlock expanded their range (Hansen 1947:70). From 14,000 to about 7,000 to 8,000 B.P. tree-lines gradually increased in elevation to conditions similar to the present (Madsen 1982:102). Forests were more widespread and abundant during early postglacial times with a white pine and ponderosa pine maximum evidenced from pollen profiles at Chewaucan and Klamath marshes (Hansen 1947:102). Xeric vegetation began moving northward during early postglacial times, invading warmer and dryer areas (Detling 1968:33).

As the forests retreated to higher elevations, grasses increased to a maximum that was established about the time of the Mount Mazama eruption at 7,000 B.P. This grass maximum was followed by a greasewood, rabbitbrush, and sagebrush maximum following the Mazama ashfall. This maximum was more pronounced at Chewaucan Marsh than at Klamath Marsh (Hansen 1947:115–118).

A shift in the seasonality of precipitation from winter to summer during the mid-Holocene favored different vegetation communities and changed the availability of surface water resources (Davis 1982:68). In the pollen profiles studied by Hansen (1947:115–118), grasses decreased and chenopods and composites increased during this time. Following about 4,000 B.P., the profiles showed increased western white pine, indicating cooler and moister conditions.

Holocene pollen profile records from the interior Pacific Northwest and northern Great Basin show "unquestionable fluctuations in vegetation wrought by short, sharp climatic episodes, by fire and by volcanic eruptions" (Mehringer 1985:185). Considerable variations resulted from "elevational differences and the relatively recent emergence of some vegetation associations."

Biotic communities at the time of Euroamerican contact were altered by livestock grazing and management practices including fire suppression (Theodoratus, Inc. 1979:14). Grazing degraded natural communities, native shrubs undesirable for browsing increased, grasses and forbs decreased, and alien annual weeds invaded. Fire suppression altered a postfire vegetational sequence of short-lived perennial grasses or root-sprouting shrubs followed by sagebrush and long-lived perennial grasses (Young et al 1976:187-191).

Under pristine conditions the chance of a naturally occurring fire taking place at any particular location in a forested area was about once every three to five years (William Hopkins, personal communication 1983). Natural fires plus whatever fires the aboriginal population may have set would have resulted in increased grassland and savannah or open forest conditions, as compared with the higher fuel load modern conditions fostered by fire suppression.

Prehistoric Fauna

Grayson (1982) reported six extinct Pleistocene mammalian genera for the northern Great Basin: the ground sloth *Glossotherium*, the giant short-faced bear *Arctodus*, the elephant *Mammuthus*, the horse *Equus*, peccaries *Platygonus*, and camels *Camelops*. As the Holocene progressed and glacio-pluvial conditions diminished, boreal animals became restricted to mountainous areas in the Great Basin (Grayson 1982:92). By about 7,000 B.P. local biotic communities in the Great Basin had approached their modern form (O'Connell and Madsen 1982:2). At Lower Klamath Lake the range of distribution and abundance of waterbirds was established early in the Holocene (Grayson 1976:832).

Grayson (1982:95-96) suggested that antelope and mountain sheep were more abundant than deer in prehistoric times although an increase in deer after 1,000 B.P. is indicated by archaeological records. Bison was also widespread, though not particularly abundant, in the Great Basin during Holocene times.

With Euroamerican interference in ecological systems, big horn sheep disappeared, antelope reorganized their seasonal movement, deer increased with increased juniper woodland and cover, rabbits thrived in the deteriorated range, and predators other than coyote decreased (Theodoratus, Inc. 1979:14).

PRE-CONTACT ENVIRONMENT AND SETTING OF THE PENINSULA SITE AREA

The present vegetation and fauna conditions around the Peninsula Site area are not those that prevailed in pre-contact times before extensive grazing, fire suppression, and the flooding of Gerber Reservoir. Figure 3 gives a hypothetical reconstruction of the precontact environment.

Pre-contact vegetation zones in the Peninsula Site's immediate environment were hypothetically derived using the 1946 USDA Forest Service type map for this area, 1952 and 1953 aerial photographs, the USDI Bureau of Reclamation's 1924 and 1967 Gerber Reservoir topographic maps, USDI Bureau of Reclamation 1906 Klamath Project Map, information from local informants (Sylvia Gerber Livingston, personal communication 1986; Orville de Vaul, personal communication 1986) familiar with the Gerber Reservoir area before the construction of the reservoir, and several assumptions including the following.

1. Fire activity, including natural fires and those from possible aboriginal burning practices, limited the pre-contact range of juniper and increased open areas.
2. Given the effects of this fire activity, areas with a low density of juniper woodland seen in the aerial photographs were probably more open shrub-steppe during pre-contact times.

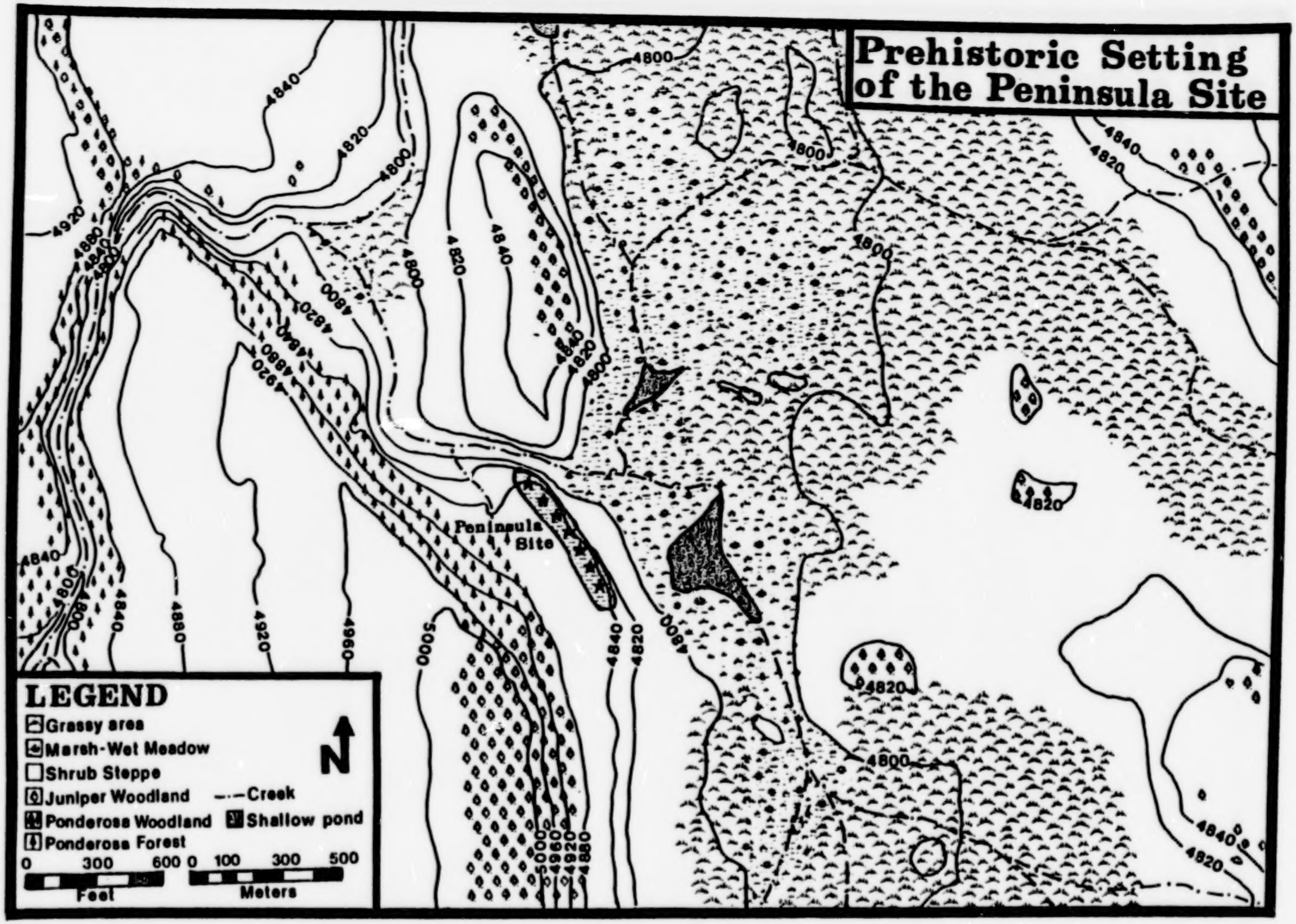

Figure 3 Prehistoric Setting of the Peninsula Site.

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3. Juniper and ponderosa pine woodland seen in the aerial photographs in steep or sheltered locations probably existed during pre-contact times.

4. Portions of the Gerber Reservoir basin with an elevation below that at which the Gerber Ranch was located were probably marshy; areas at or above this elevation were probably relatively dry.

The reconstructed vegetation zones show an increased amount of shrub-steppe vegetation in the reservoir area. Of particular significance is the presence of open grasslands and marshes immediately east of the Peninsula Site. At least three areas within the now inundated reservoir appear on the reservoir topographic maps as being below the elevation of the immediately surrounding terrain. Two of these areas are about 30 to 60 cm (1 to 2 ft) below the pre-reservoir elevation of Miller Creek at its outlet. This would indicate the presence of shallow ponds in a marsh setting.

These shallow ponds and marshes, as well as surrounding wet or moist meadows, would have provided habitat for arrowroot, sego lily, water lily (wokas), sago pondweed, bur reed, widgeon grass, cattail, tule, sedges, rushes, and camas. This environment would have attracted a variety of surface feeding or dabbling waterfowl and shore birds including swans, geese, mallards, teals, pelicans, bitterns, and herons. Indeed, local informants indicate that the area was frequented by numerous waterfowl prior to the construction of the reservoir (Sylvia Gerber Livingston, personal communication 1986; Orville de Vaul, personal communication 1986). Ospreys would also have been attracted to this water-side setting.

The site itself is located on high ground overlooking these former pond areas and the surrounding marsh-grasslands. Miller Creek flowed directly north of the northwestern part of the site. At this point a relatively steep slope of perhaps 30 to 40 percent runs from the site to the creek. Along the more southeasterly part of the site the slope to the lower lying marsh is more gradual. Creeks and ponds would probably have provided habitat for suckers, trout, chub, and eels. The steep creek bank may also have provided habitat for fresh water mussels.

The surrounding grasslands and shrub-steppe would, as today, have provided habitat for numerous tuberous forbs and grasses. The juniper and ponderosa pine woodland as well as the ponderosa forests along riparian areas and in the higher elevations a short distance south of the site would have provided habitat for numerous fruit and berry bearing plants, tuberous plants, grasses, and numerous small mammals. Deer prior to 1,000 B.P. were not as prevalent as today, and elk would probably have occupied the woodlands and forests. and antelope would probably have inhabited the more open country in the area. Mountain sheep might possibly also have populated in higher elevation areas. The woodlands, forest openings, and forest and shrub-steppe ecotonal settings would also have harbored a variety of shrubs, forbs, and grasses.

Understanding past environmental conditions of the Peninsula Site area is critical to interpreting the archaeological records. As the previous review indicated, conditions fluctuated over time. These fluctuations would also have resulted in changes in the distribution and availability of subsistence resources. These changes may be discernible in the archaeological record. Further, the area's environment has been substantially altered during historic times. Reconstructing the pre-contact environment aids in understanding why people chose this location as a place to live.

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3. ETHNOGRAPHIC BACKGROUND

The Modoc occupied the area roughly south of the drainage divide between the Sprague and Lost rivers, east of the Cascade Divide to the west side of Goose Lake, and south to the Medicine Lake Highlands (Figure 4) (Ray 1963:xii). To the north were the Klamath, to the northeast were the Yahuskin Northern Paiute, to the east were the Kidudotado Northern Paiute, to the south were the Achumawi, and to the west were the Shasta. The Goose Lake area was shared by the Modoc with the Northern Paiute and Achumawi. The Achumawi, although concentrated along the Pit River south of Modoc territory, did range as far north as the Lost River and Goose Lake while hunting (Kniffen 1928:308–310; Kroeber 1925:304).

This section of the Peninsula Site report examines the ethnographic record of the Modoc who made use of this part of south-central Oregon. From this record analogies will be subsequently drawn to help interpret the archaeological record at the Peninsula Site. Since the Peninsula Site has evidence of rock structures, particular emphasis will be placed on the nature of the settlement patterns and the house structures of the aboriginal inhabitants.

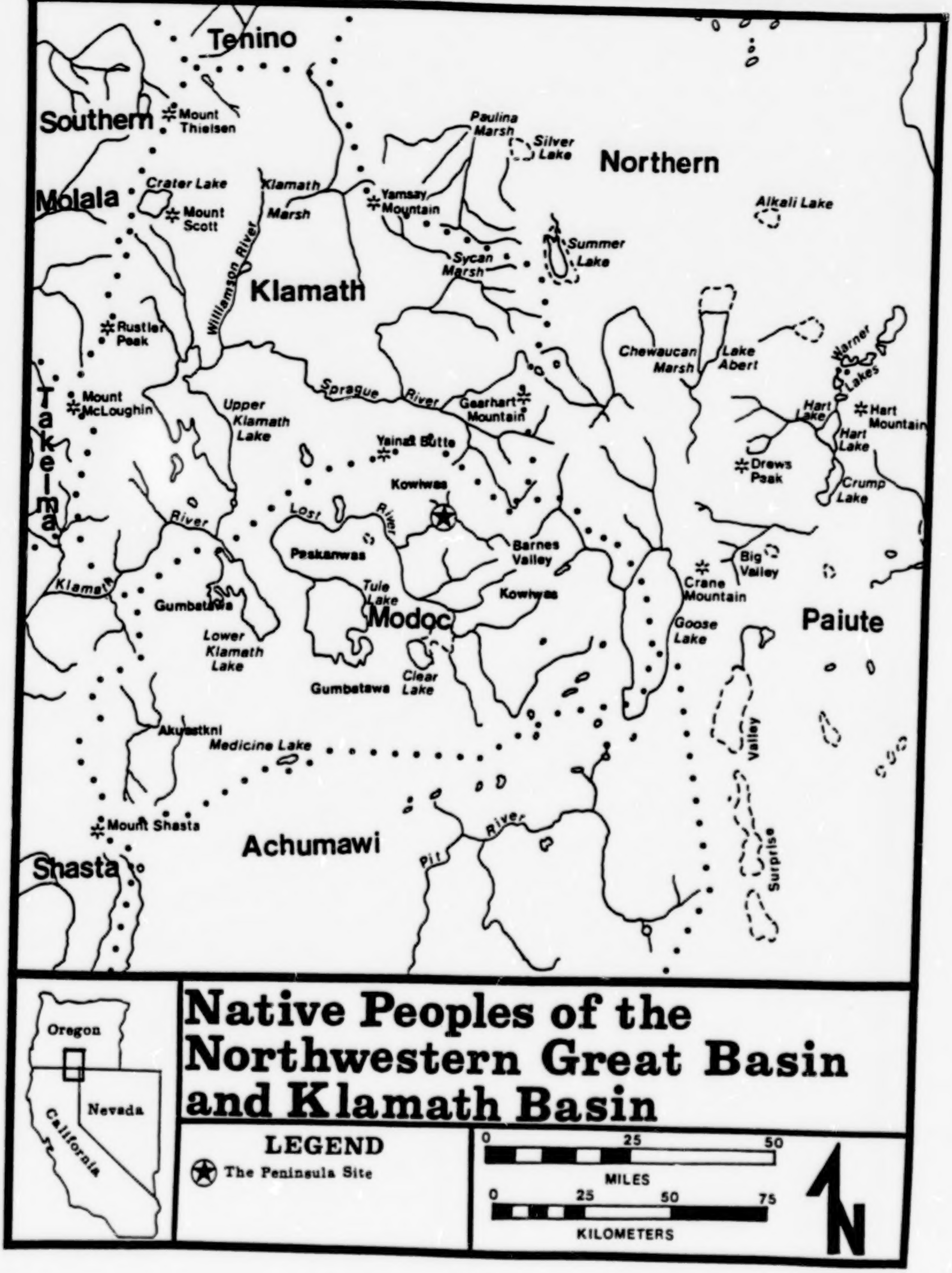
LANGUAGE AND CULTURAL AFFILIATION

The Modoc speak one of two dialects of Lutuami, a Penutian language. The Klamath speak the other (Spier 1930:1). Various ethnographers have drawn differing conclusions about the association of the Modoc with other groups. Spier (1930:233) thinks the Klamath and Modoc had affiliations with the Plateau culture area and a strong relationship with northeastern California, citing these peoples' riverine orientation as supportive of this placement. Kroeber (1939:51–53) groups both the Klamath and Modoc with the neighboring Achumawi and Atsugewi in a special sub-area of the Great Basin. He saw continuity for the Klamath and Modoc with the prehistoric Lovelock Culture of the Lower Humboldt Valley and considered them to have had only a recent nineteenth century overlay of Columbia Plateau and Plains cultural traits. Stern (1966:4) considers the Klamath and Modoc culture as fundamentally Great Basin in origin although influenced by California and Plateau cultures. In his scheme the Klamath diverged towards the Plateau and the Modoc toward California. Ray (1963:xii–xiv) views the Klamath and Modoc as being fundamentally different, finding Klamath affiliations with the Plateau and Modoc affiliations with central California.

MODOC SUBDIVISIONS

The Modoc were divided into three or four tribelets. The Paskanwas or "river people" lived in the lower Lost River valley from the Lost River gap to Tule Lake. The Gumbatawa or "people of the west" lived west of a line from the ridge separating Lower Klamath Lake and the Lost River, through Tule Lake, and from Tule Lake southeastward to the Modoc

Figure 4 Native Peoples of the Klamath Basin and Northwestern Great Basin.



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territorial boundary. East of this line, except for the lower Lost River, lived the Kowiwas, "people of the far out country" (Ray 1963:202–203). The Peninsula Site is located in what was the territory of the Kowiwas. The Modoc living the southwestern part of the Gumbatawa division, the lower part of Lower Klamath Lake south to Mount Shasta, were sometimes referred to as Akuastkni (Ray 1963:205).

Ray (1963:203) emphasized that these divisions were purely geographical, not cultural and ethnic, and that minor cultural differences were responses to environmental differences. Leadership at both the village and tribal division levels was based on personal prestige. Sampson (1985:11) suggests that the tribal divisions or tribelets could be seen as "exploitation spheres."

SUBSISTENCE

The Modoc followed a generalized subsistence strategy that relied heavily on dryland roots and grass seeds and on small and big game hunting supplemented by fishing and berry and fruit gathering. People were mobile, as necessary, moving from one location to another depending on the relative abundance of a particular resource and its season of availability.

With the final melting of winter snows, usually in March, the Modoc dismantled their winter houses and carefully cleaned the framework and stored the covering materials. From their winter villages they moved in early spring to semipermanent fishing villages for the March large-species sucker runs, which lasted for three to four weeks (Ray 1963:180–181, 193).

Suckers were taken in lakes or in streams at spawning times with a triangular dip net consisting of slip rings on an A-frame. A plain, willow-pole funnel-trap was used to capture fish in stream rapids. A two-pronged spear was also used from shore positions (Ray 1963:193–194). Fish were dried using stripped pine seedlings as drying racks (Ray 1963:181). During April and early May desert parsley and other early roots were gathered in the sagebrush scab (Ray 1963:198).

As epos, the major root crop of the Modoc, became available and the sucker runs diminished, the Modoc moved to villages at the epos digging grounds. Epos was found in forest openings, meadows, and on rocky slopes and the root was gathered prior to blooming during a short three to four week season in May. The root was gathered from locations progressively further from the village (or summer encampment). When all patches within working distance had been exhausted, the village moved to a different location. The best village sites were near streams or rivers with access to trout, which would be available through August. This was also a time for the intensive gathering of waterfowl eggs (Ray 1963:181, 197-198).

In late June and July the Modoc moved to moist meadows, many in or near coniferous forests, to harvest camas. As this resource was generally widely dispersed, this time of year usually involved the most widespread population dispersal and the frequent movement of camps. Harvest techniques and travel and logistic concerns were similar to those for epos, with the harvest lasting about a month. The roots were primarily stored for winter use. Processing included cooking the camas in earth ovens at winter village locations. Other important roots gathered included arrowroot and sego lily. The roots, stems, and shoots of bur reed, cattail, sedges, and tule were also gathered for use as food (Ray 1963:181, 198, 218).

During the camas harvest time hunting of waterfowl and small game also took place. Waterfowl and other birds hunted include the brant, crane, curlew, duck, goose, gull, loon, swan, pelican, mudhen, prairie chicken, quail, and sage hen. Waterfowl were taken with nets or bow and arrow. Decoys were used with both methods. Small game hunted include chipmunks, the fisher, mink, porcupine, raccoon, beaver, rabbits, skunks, squirrels, and the woodchuck or ground hog (Ray 1963:188-189, 220).

Where trout-bearing streams were close to camas gathering areas, fishing continued until trout diminished in number by late summer. The Modoc also fished for chubs, minnows, and lampreys, and collected freshwater shellfish. Chubs, minnows, trout, and eels were captured with bone hooks and bone gorgets (Ray 1963:181, 193, 195).

During late July white camas was harvested and a leaching method used in processing to extract its poison. Late July also found individual Modoc hunting antelope on the plains and mountain sheep in the lava beds south of Clear Lake. Root gathering continued and the seed collecting season, which ran through September, began with the gathering of water-lily seeds (Ray 1963:181–182, 199).

In late August and September the Modoc utilized a second run of suckers and harvested a variety of grass seeds, berries, and fruits. Seeds were gathered by beating plants with a snowshoe-shaped basketry plaque made of closely woven juniper withes. Important seed plants include sunflower, buckwheat, willow dock, ryegrass, plains mustard, lamb's quarters, manna grass, blazing star, tarweed, and balsam root. Important fruits and berries include huckleberries, Sierra plum, twinberries, serviceberries, western chokecherry, blue elderberry, and strawberry (Ray 1963:182, 199-200, 218).

Toward the end of September attention shifted to more remote and higher elevation areas where huckleberries and other fruits and berries were gathered. Big-game hunting activities also began with the hunting of deer and elk. Deer were sometimes hunted by driving them with fire to hilltops or small mountains. Prior to the big-game hunting expeditions, the hunters participated in a sweat house ritual. Other medium to large game hunted include black and grizzly bears, cougar, coyote, foxes, and wolves (Ray 1963:182–184, 187–189, 220). Most Modoc ceremonial centers were in the uplands as ceremonial activities were scheduled for the same time as hunting and berry-gathering in September and October (Sampson 1985:11).

Hide processing involved the use of a defleshing or dehairing post about 4 ft (1.2 m) long, set in the ground at an angle. For heavy skins a scraping frame of mountain mahogany was used. Dehaired skins were smoked by hanging them from a framework of light willow poles over a fire in a small depression about 45.7 cm (18 in.) in diameter and 30.5 cm (12 in.) deep (Ray 1963:190–193).

In October people returned to winter villages, which were used as a base from which hunting continued until December. Some deer hunting continued throughout the winter but it was not particularly productive. Communal hunting of antelope with a chute and pound method was practiced by the Modoc in the area between Goose and Tule lakes, particularly Yokum Valley and Steele Meadow in the spring and fall (Ray 1963:182, 184).

In December the winter trout runs appeared and lakes and streams were fished. Fishing continued throughout the winter through holes in lake and stream ice (Ray 1963:182).

TYPES OF STRUCTURES

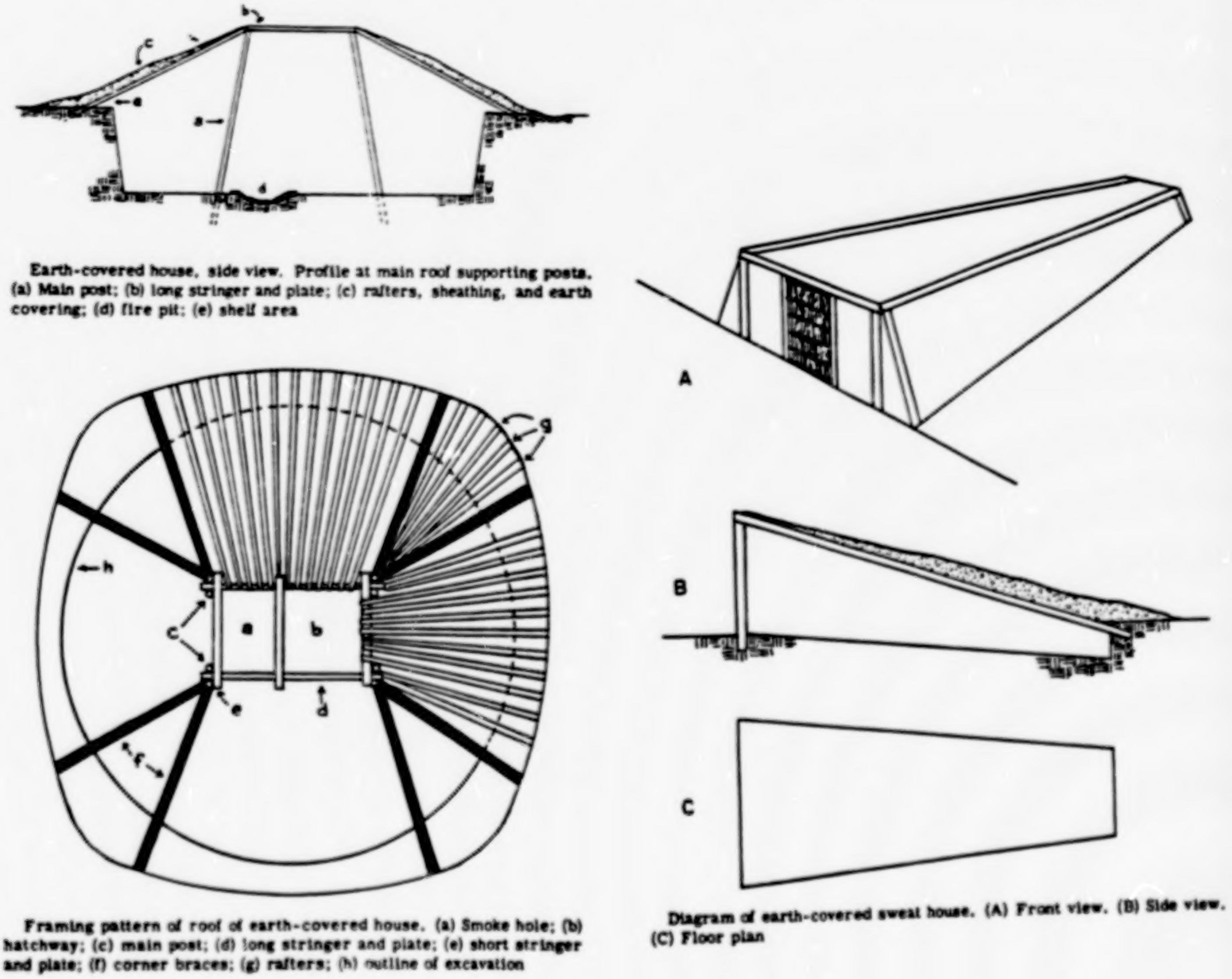
Modoc villages exhibited a number of different house types (Figures 5 and 6). Winter village structures included a semisubterranean, earth-covered lodge; an elongated, mat-covered house; and a "dome-shaped, mat-covered hut used principally as a utility house but also to a limited extent as a dwelling" (Ray 1963:146). This hut type was also the typical summer structure. Circular sagebrush windbreaks were also used in the summer, especially when travelling. Ray (1963:146) reported that,

> The domed hut is said to the oldest type, with a more extensive use in winter than is the case more recently. It may indeed have antedated the earth-covered lodge, or merely have enjoyed wider usage. It is certain that acquisition of the steel axe greatly stimulated the construction of earth houses and the elongated mat house.

Powers (1877:255) reports that prior to the arrival of Euroamericans the Modoc built dwellings "consisting generally of a frame of willow poles with tule matting overspread." He attributes the shift to earth lodges to the cessation of intertribal conflicts caused by the arrival of Euroamericans. This cessation made the labor necessary for the construction of earth lodges worthwhile. Previously such labor might have been in vain should the structure be destroyed in a conflict. Ray (1963:147) also notes that family groups that "lacked the ambition and resources" for undertaking the major task of building an earth lodge for the winter instead used "one of the inferior structures better adapted to summer use."

The steps or door of each house were usually oriented to the east, although sometimes to the north or south. Because the land of the dead was to the west, houses were not oriented in that direction (Ray 1963:164).

Figure 5 Modoc earth lodge and earth covered sweat house (from Ray 1963:148, 161).



Earth-covered house, side view. Profile at main roof supporting posts. (a) Main post; (b) long stringer and plate; (c) rafters, sheathing, and earth covering; (d) fire pit; (e) shelf area

Framing pattern of roof of earth-covered house. (a) Smoke hole; (b) hatchway; (c) main post; (d) long stringer and plate; (e) short stringer and plate; (f) corner braces; (g) rafters; (h) outline of excavation

Diagram of earth-covered sweat house. (A) Front view. (B) Side view. (C) Floor plan

a. Modoc earth lodge

b. Modoc earth covered sweat house

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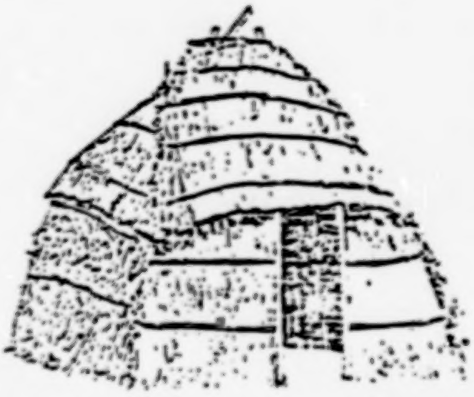
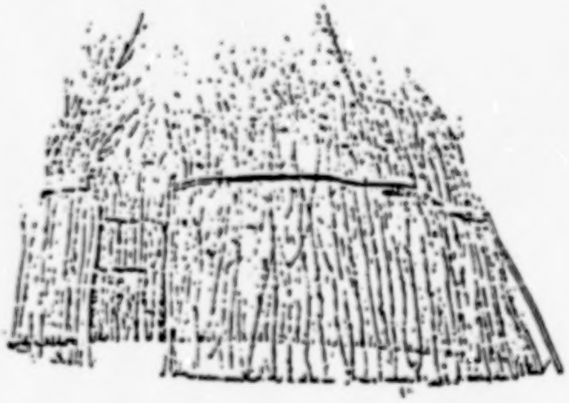
Figure 6 Northern Paiute brush wickiup and brush wind-screen (from O'Connell 1975:Figure 9).



a. Northern Paiute brush wickiup
(similar to Modoc dome-shaped, mat-covered hut)



b. Northern Paiute brush wind-screen
(similar to Modoc circular sagebrush windbreaks)

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The Earth Lodge

The earth lodge was entered through a hatchway at the top, which also functioned as a smoke hole. Each spring the lodges were dismantled to air the circular house pits and to ensure a dry and sanitary pit when the houses were rebuilt. Rebuilding an average earth lodge took about two weeks. Construction of a new one took four to six weeks (Ray 1963:153, 180, 182).

House pits averaged 1.2 m (4.0 ft) deep. House diameters ranged from 4.9 to 12.2 m (16.0 to 40.0 ft) with a mode of about 6.7 m (22.0 ft). Smaller houses were used by one or two families, the largest ones by six or eight families (Ray 1963:147-149).

The conical roofs of the lodges were supported by long beams and rafters of pine, although juniper and cottonwood might be used. The sloping outline of the roof was covered by three layers of material to provide insulation. The first layer was of tule mats fastened to each other and the rafters by swampgrass cordage or sagebrush bark. Swampgrass mats were an inferior substitute for tule. The second layer was of a strengthening material, preferably planking or bark, but sometimes sagebrush. The final layer was of earth (Ray 1963:149–152).

The Mat-Covered House

The mat-covered house had steep, sloping walls. The entrance was at ground level at one end (Ray 1963:146). Ray (1963:154) notes that although it was primarily a winter dwelling, "it served also as a summer residence where relative permanency and substantial accommodations were required." This house type was used by small family groups of limited resources and also when little time was available for construction.

When used for winter the mat house had a shallow pit 30 to 40 cm (12 to 16 in.) deep, walls banked with earth from 30 to 70 cm (12 to 24 in.), and a relatively thick covering of mats. Generally of an elongated rectangular shape, the house was 3.7 to 4.3 m (12.0 to 14.0 ft) wide, and its length was no more than twice the width (Ray 1963:154-155).

The Dome-Shaped House

The dome-shaped house was usually a simple framework of bent willow pieces covered with matting. At ground level the willows had a diameter of 3 m (10 ft). Maximum height was about 2 m (7 ft). A smoke hole was in the top, and a small rectangular opening on any side but the west served as a door (Ray 1963:156–157).

Ray (1963:157) reported that the dome-shaped house was sometimes used as a winter home for "elderly persons . . .[who] sometimes found it difficult to climb the ladders of earth houses." When used as a winter home "the domed dwelling was made warmer by additional layers of matting and by banking earth around the outside edge." Ray (1963:180) noted that the dome-shaped house was also used as a summer dwelling in winter village locations for the elderly and crippled too infirm to leave the winter village location.

The Circular Windbreak

Commonly used during summer travel, the circular sagebrush windbreak had walls about 1.2 m (4.0 ft) high. These walls were of sagebrush pushed together so that their branches interlocked. Their diameter varied from 1.5 to 3 m (5 to 10 ft) or more (Ray 1963:146, 157).

Utility Structures

Three main types of utility huts were used, all identical in structure to the dome-shaped house. Earth lodges and most mat houses had separate cooking huts adjacent to them near the door or steps. Other utility huts were used for storage of bulky, non-food materials. These also concurrently were used as work rooms for women involved in sedentary activities such as mat-making, spinning, and sewing. The third type of utility hut was the menstrual hut, which was also used for childbirth. Storage and work huts sometimes were used also for these purposes (Ray 1963:157–158).

Sweat Lodges

The Modoc built two distinct types of sweat lodges: a uniquely designed, earth covered type and a dome-shaped lodge, which Ray (1963:160) termed the "so-called Plains type." The domed sweat lodge was identical in construction to the utility lodge except for the absence of a smoke hole and sometimes the omission of a door.

The earth-covered sweat lodge was built over a shallow, trapezoidal pit with the front width double that of the back and the greatest dimension from front to back. The pit sloped from ground level at the front to 50 cm (20 in.) or more at the back. Front posts were placed 2 m (7 ft) apart with a height of 1.5 to 1.8 m (5.0 to 6.0 ft). Longitudinal framework poles were sloped from back corners to the post tops, across which was a heavy plate. The front wall was vertical, and the side walls were steeply sloping. The lodge walls and roof were constructed and covered in the same way as the regular earth lodge (Ray 1963:160–161).

House Type Use Rules

The preceding discussion of the various Modoc house types indicates that there were no universal rules for what type of house structure a Modoc might use for shelter. Indeed, the ethnographic record indicates that in the winter people might use any one of the three major house types: the earth lodge, the mat lodge, or the dome-shaped house. Housing type choice was influenced by factors involving the health and age of the potential occupants, the resources available for construction, and the time available for construction. A winter village might have had one, two, or all three major house types at the same time.

VILLAGES AND SETTLEMENT PATTERN

Houses in a village were arranged irregularly, sometimes several hundred feet apart. If the village was along a watercourse the houses were arranged in an irregular row (Ray 1963:146). Ray (1963:204–211) recorded the location of 47 Modoc villages, most of which were occupied until about A.D. 1865 (Figure 7). Some continued to be occupied after that date. Not all villages were occupied simultaneously. Many were seasonal and some were alternate locations (Ray 1963:204).

Permanent (winter) villages usually consisted of three to seven earth lodges and their ancillary structures. Villages might reach 10 to 15 lodges, although the tendency was for a new village to be established nearby when local populations expanded. Ray (1963:204) noted that this frequently occurred in the Langell Valley. He also noted that one or two houses in most settlements were considerably larger than the others; they "were characteristically the homes of village leaders or shamans and . . . served as places of gathering for religious or political purposes."

Small villages consisted of two or three houses, large ones had six to eight houses, and very large ones had more than eight. Smaller houses accommodated one to three families, larger ones three to four. Modoc families averaged five persons (Ray 1963:204).

Fishing villages and summer villages were semipermanent, usually reoccupied each year. The "economic productivity of a locale" determined village locations. Fishing villages were occupied until the sucker runs diminished (Ray 1963:180–181). Summer villages were

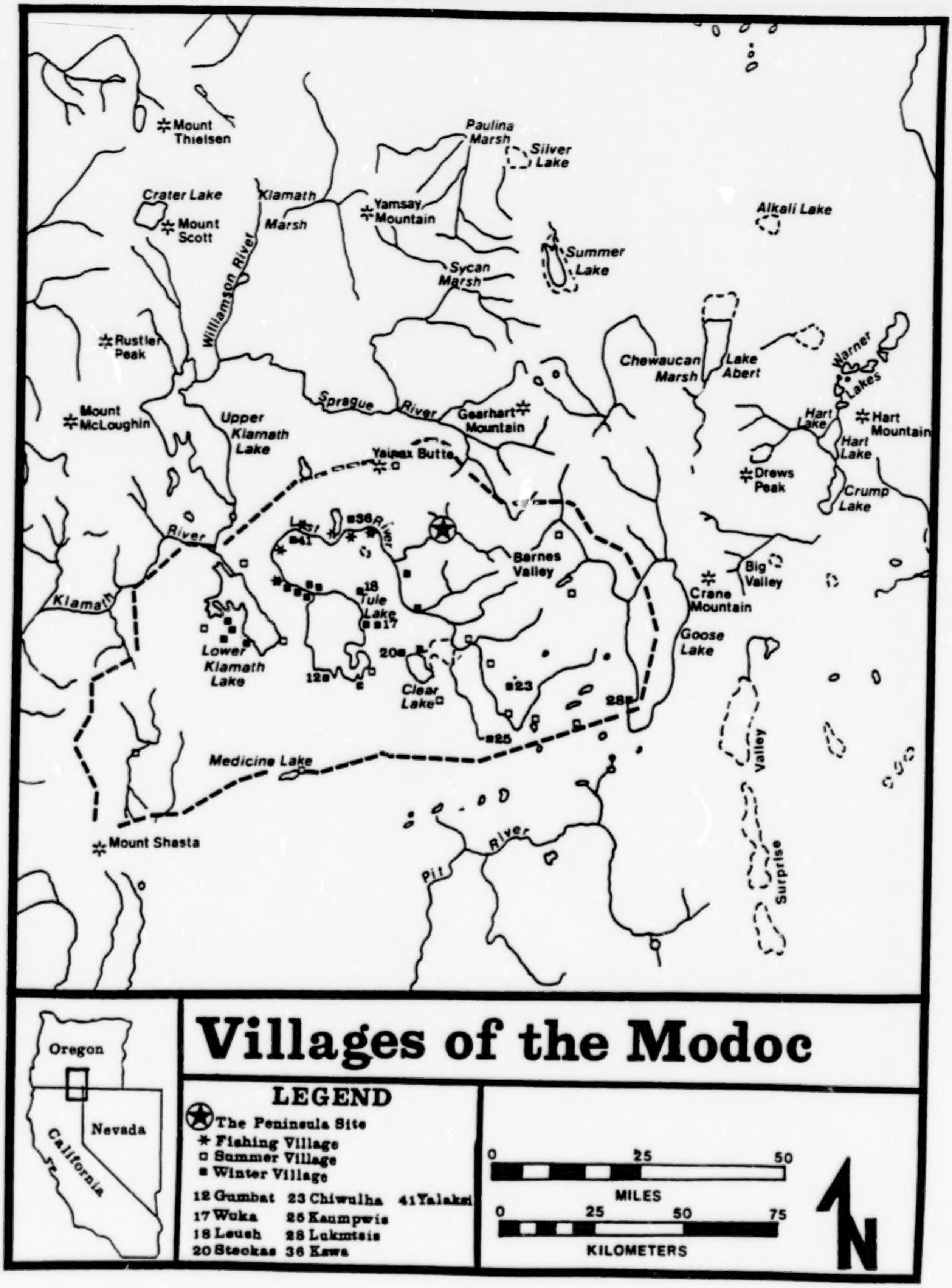
> occupied as long as possible. . . . [their] occupants moved only when the specific economic season gave way to another or when the local resources were exhausted, as in root digging, and the remaining patches were too far distant (Ray 1963:181).

It is not totally clear from Ray (1963:204–211) what is meant by permanent. Of the 47 villages listed by Ray, 34 were given a single word designation without any qualifiers. Of these 34, 16 were designated permanent, 15 summer, and 3 fishing villages. One village was given no specific designation but was simply described as having large earth-covered houses.

Twelve of the villages listed were given a dual designation or are qualified in some way as to suggest multi-seasonal use. Two permanent villages were described as being more populous or principally occupied during the winter. Five permanent villages were described as being more populous during the summer, used each summer, used as a base for subsistence activities, or located in areas with good root or summer resources. One permanent village was described as being more populous in the summer than winter, and one summer village was described as having a small winter population. One permanent village was described as being populous during fishing season, and one fishing village was described as also having a winter population. One village was described as a summer fishing village.

It seems reasonable to assume that permanent villages were occupied during the winter, but it is unclear which were occupied in other seasons. As previously described, Ray (1963:180)

Figure 7 Villages of the Modoc (from Ray 1963).



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indicated that the elderly and crippled too infirm to go on the seasonal rounds might stay in a winter village during the summer, living in a dome-shaped summer house. Sampson (1985:11) interpreted Ray to mean that permanent denotes "permanently maintained rather than permanently occupied" and that this was the case for both winter and summer villages.

Most permanent villages were located at elevations of 4,200 ft (1,200 m) or less (according to USGS quadrangle maps) and were along the Lost River or around Lower Klamath, Tule, or Clear lakes (Ray 1963:207). This was not, however, universal. One exception to these general locational parameters was a winter village located in a valley west of Tule Lake (village 17, Wuka). The 1951 USGS Tule Lake quadrangle map indicates that this village was at an elevation of about 4,760 m (1,451 m). Ray (1963:209) attributes the separation of this village from one located immediately west along Tule Lake to the "result of varying preferences for house sites."

Assuming that permanent meant winter, 17 of the 47 villages recorded by Ray (1963:205–211) were winter villages. Two were winter and fishing villages, one was a summer and fishing village, and three were only fishing villages, all located along Lost River. Fifteen villages were only summer villages. Assuming that villages mentioned as being more populous in summer or winter were used in both seasons, and that permanent villages described as being located near summer subsistence resources were also used in both seasons, nine of the 47 villages listed were both winter and summer villages. Crematories were located in proximity to villages, particularly villages somewhat isolated from others.

It appears there were no universal rules for the location of or for scheduling the time of occupation of winter villages. Rather, their location and time of occupation depended on a number of factors related to the availability, diversity, and concentration of subsistence resources and the suitability of a location for the construction of shelters, Thus winter villages might be located at elevations above 4,700 ft (1,433) and at non-river and non-lake settings. The following summaries highlight this diversity.

The winter/summer village (village 12, Gumbat) on the south shore of Tule Lake is only described as being "particularly populous during the winter months" (Ray 1963:208). No specific mention of summer use or resources was given. The village did give its name to the Modoc in the western part of their territory, the Gumbatawa. A cremation place was near this village.

The winter/summer village (village 18, Leush) near the present town of Malin "was more populous in summer than winter because many root products were available in the vicinity" (Ray 1963:209). A crematory also was nearby.

The winter/summer village (village 20, Steokas) on the north shore of Tule Lake "was important because it was in a desirable location for winter housing and also provided excellent summer resources of roots and seeds. . . . A cremation place was situated outside the town" (Ray 1963:209).

The winter/summer village (village 23, Chiwulha) at Pot Hole Spring west of Blue Mountain and east of Clear Lake was a location "where root digging was extensively pursued. . . . A cremation place was maintained here so that it would be unnecessary to carry corpses a long distance for disposal" (Ray 1963:209). The 1962 USGS Steele Swamp quadrangle map indicates that Pot Hole Spring is at an elevation of 1,476 m (4,842 ft).

The winter/summer village (village 25, Kaumpwis) at the "north end of Fairchild Meadow [Fairchild Swamp], south of the bend of South Fork of Willow Creek [Boles Creek]" southeast of Clear Lake was a site "utilized each summer for antelope hunting and root and seed gathering" (Ray 1963:209). The 1962 USGS Jacks Butte quadrangle map shows this location at an elevation of 1,494 m (4,900 ft).

The winter/summer village (village 28, Lukmtsis) on a peninsula jutting into Goose Lake was described as being "a major base for hunting of deer, antelope, and waterfowl, and the gathering of roots and seeds. It was the only permanent Modoc village on Goose Lake" (Ray 1963:210).

The winter/summer village (village 36, Kawa) near the present town of Dairy is described as a "summer village, possibly with a small winter population" (Ray 1963:210).

The winter/summer village (village 41, Yolaksi) at Nuss Lake was described only as a permanent village "occupied principally in winter" (Ray 1963:211).

MODOC USE OF THE GERBER RESERVOIR AREA

No specific mention of Modoc use of the Gerber Reservoir was found in the ethnographic literature. A local informant, however, did relate how elderly Modoc would come up into the area with their grandchildren to hunt and gather roots, especially epos, and seeds during the summer (Orville de Vaul, personal communication 1986). Woodchucks or groundhogs were particularly mentioned as a principal game animal. This use of the area was reported by the informant as occurring during the years prior to and just after the construction of Gerber Dam, until about 1935.

The preceding review of the ethnographic record indicates that the Peninsula Site's location was a short distance inside the periphery of Modoc territory. This record also indicates considerable variation in Modoc house types and season of use. Thus, the Modoc ethnographic record may provide useful analogues for interpreting the archaeological record at the site, particular circular rock features (rock rings). In addition, the record also shows that some ethnographic villages were in upland areas with elevations greater than 1,433 m (4,700 ft). Thus the ethnographic record does not limit the interpretation of the Peninsula Site's record to solely one suggesting that it was a summer rather than a winter village.

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4. ARCHAEOLOGICAL BACKGROUND

A number of archaeological sites have been investigated within a 100 km (62.5 mi) radius of the Peninsula Site, 35KL87 (Figure 8). The following discussion focuses on late Pleistocene and early Holocene sites, then on sites that help form the basis for the determination of settlement and subsistence patterns during the mid to late Holocene. Finally, a brief overview of sites within about 10 km (6.3 mi) of the Peninsula will be provided in order to define the immediate cultural context of human activities there. Particular emphasis is placed on the archaeological record of the Lake Abert area where recent research has indicated the presence of circular rock features similar to those found at the Peninsula Site.

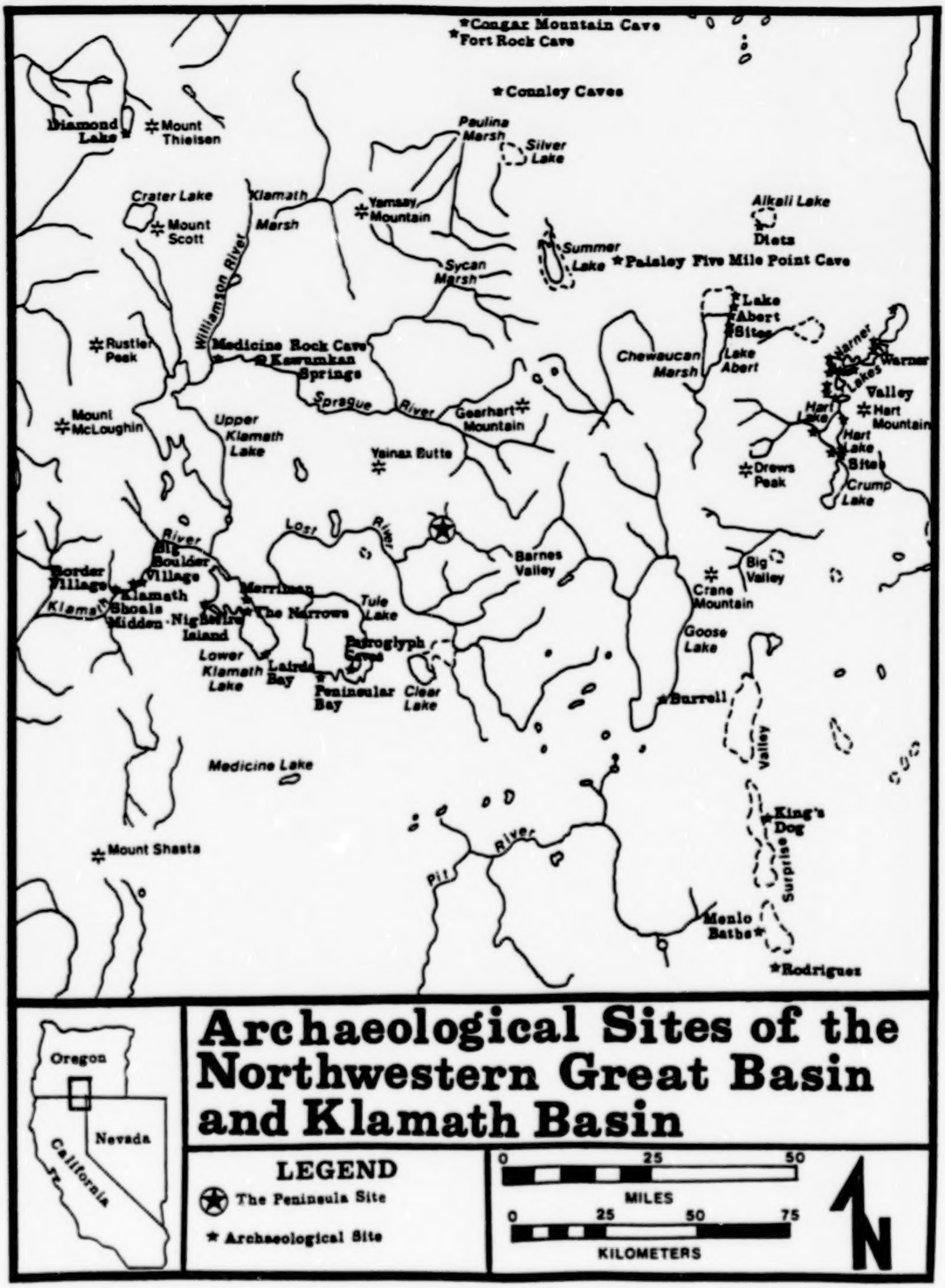
THE PLEISTOCENE AND EARLY HOLOCENE

With the advent of radiocarbon dating in the 1950s the conclusions of Cressman et al. (1940) that the northern Great Basin was occupied very early were confirmed. Bedwell (1973:141–143, 157–158) reports a date of 13,200 B.P. (11,250 B.C.) for the earliest Fort Rock Cave period and speculates that the area was intermittently used by "migrating groups of hunters and gatherers having a generalized economy not yet focused on a lake environment."

Early occupation of the northern Great Basin is best evidenced by the remains of Paleo-Indian hunters of terminal Pleistocene times, including the Clovis Culture (Aikens 1978a:147). With an estimated date of 11,500–11,000 B.P. (9,450–8,950 B.C.), the people of the Clovis fluted point tradition appear to have been broad-ranging hunters of big game (Aikens 1978b:75). Jennings (1978:36) suggests that these hunters cyclically wandered from one resource to another, frequently returning to favorite locations and camping near water sources. While Jennings (1978:11) thinks plant gathering was minimal until about 9,000–8,000 B.P. (6,950–59500 B.C.), Davis (1963:209) feels it likely that these early people also used fruits, bulbs, nuts, and greens.

The fluted point tradition is followed by the Western Pluvial Lakes Tradition, described by Bedwell (1973:170) and believed by Aikens (1978b:75) to be congruent with the southern California San Dieguito complex (Warren 1967) and the Windust phase of the Columbia-Snake region (Leonhardy and Rice 1970:4–6). This early Holocene tradition is characterized by a diversified lacustrine subsistence base with occupations along or near lake shores (Bedwell 1973:54–56). According to Bedwell (1973:158), during the time of this tradition population density increased, hunting diversified to include land birds and waterfowl, and plant foods and some fish were used. Aikens (1978b:75) sees this interval as part of a "direct historical relationship between the Clovis Culture and the Desert Culture" with the convergence point being the exploitation of lakeside resources.

Figure 8 Archaeological Sites of the Northwestern Great Basin and Klamath Basin.



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SETTLEMENT AND SUBSISTENCE

Jennings (1957) and Jennings and Norbeck (1955) developed the notion of a Great Basin Desert Culture, reflecting on ethnographic and ethnohistoric analogy from the modern Great Basin Shoshone (Steward 1938). This concept was later subsumed under the Desert Archaic and then the Western Archaic. Fowler and Jennings (1982:100) describes the archaic lifeway as "most versatile in adaptation, developing different tool kits as required in the collection of selected resources in a well established yearly-round" within an overall hunting and gathering subsistence economy.

Aikens (1982:151) characterizes the northern Great Basin culture by the "maintenance of the same basic tool types and activity patterns . . . throughout the last ten millennia or so" with climatic fluctuations altering environments "sufficient that the intensity of occupation they actually sustained varied significantly over time." Adjustments to environmental change were made "not in the realm of technological adaptation, but rather in the realm of social behavior." These changes are reflected in the archaeological evidence for settlement and subsistence.

Adjustments to changing environmental conditions, particularly during the mid-Holocene regime of less effective moisture, took differing forms. The variation in settlement and subsistence patterns prompted Bettinger (1978:28) to suggest that the Great Basin was characterized by cultures with different adaptive strategies, too varied to be subsumed under the Desert Archaic concepts, and not explainable by environmental variables. Aikens (1982:51), on the other hand, interprets the archaeological evidence to indicate that

> the relative degree of sedentism (or atomism) of Great Basin populations was directly related to environmental variables . . . [and that] in a topographically diverse locality where major biotic zones interfinger or are closely juxtaposed, the standard Great Basin Desert Culture practice of foraging at a variety of resource loc on a continued seasonal basis throughout the year could adequately support a relatively sedentary pattern of human occupation.

Aikens (1982:151–152) further observed that the "presupposition of Great Basin anthropology that the distribution and abundance of food and industrial resources controlled the distribution, density and residential stability of human groups" was supported by the archaeological and ethnographic evidence.

Using linguistic, archaeological, and environmental evidence Aikens and Witherspoon (1986:18–19) developed a model of Numic (Paiute-Shoshone-Ute) peoples expanding from a central Great Basin core homeland inhabited by them since the break up of the Utaztecan language 5,000 years ago. They suggested that Numic peoples with their mobile, drylands-adapted lifeway, replaced the more sedentary, lacustrine and/or horticulturally oriented Lovelock, Fremont, and Anasazi peoples in areas abandoned during the great Thirteenth Century A.D. (750–650 B.P.) drought. Further, this replacement was seen as part of an ebb and flow "coordinated with and motivated by recurring changes in the effective moisture regimes" and initially involving "the classical Desert Culture and the lake-marsh or lacustrine life styles" of about 5,000 B.P. (2,950 B.C.).

Under Aikens' (1985:519–528) version of this model "thoroughgoing lake-marsh specializations" during early postglacial times are absent. Early lake-shore occupants exploited wetlands flora and fauna, but the "tool kit used at lakeshore sites was one just as applicable to hunting and gathering in terrestrial habitats." All the early lake-shore occupations were eventually "terminated, due either to late-postglacial drowning of the marshlands . . . or more generally, to mid-postglacial desiccation."

Later Holocene lake-marsh cultures of the western Great Basin differed from earlier versions by their specific adaptations to the lake-marsh environmental setting. These resulted in a stability sufficient to warrant "investment in the expensive construction of relatively substantial long-term dwellings." Pit house villages were established, and significantly larger populations were probably present. These adaptations began just after 3,000 B.C. (4,950 B.P.) when "a climatic recovery from a mid-Holocene interval of decreased effective moisture" resulted in reborn lakes (Aikens 1985:525–526).

These later cultures appear to have originated with "relatively numerous and expansive Californians" of the "cool, wet Sierra-Cascades" who were related to and communicated with the marsh-adapted people of California's Central Valley. These montane people "were preadapted to take advantage of the freshening marshlands" of the western Great Basin. As conditions became moister they expanded into the lowlands and crowded "back into their desert hinterland the Great Basin peoples who had preceded them." As the drying climate after the Ninth Century A.D. (1,150–1,050 B.P.) reduced the productivity of the lowland lake-marsh habitats, the "wetlands-adapted Penutian and perhaps Hokan-speaking peoples" gradually pulled back into their mountain homelands. The abandoned country was then claimed by the desert-adapted Paiute (Aikens 1985:527). The Modoc of the Peninsula Site appear in the discussion as one of the "wetlands-adapted Penutian" peoples.

Surprise Valley

O'Connell (1975:75) identifies a regional settlement and subsistence system with two main variants for the Surprise Valley area of northeastern California and northwestern Nevada that was characterized by permanent or semipermanent base camps near valley floor marshes. These camps were occupied by five or six extended families. Resources found within a two hour walk from these villages formed the basis for subsistence: roots, seeds, and small game available in the spring and summer; plant foods suitable for storage, big game, and some small game during the winter.

Site categories identified by O'Connell (1975:23–26) include lowland occupation sites, caves, lowland temporary camps, upland temporary camps, obsidian quarries, lowland seed gathering and processing stations, and chipping stations.

In a manner similar to the marsh-grassland resources lifeway of the ethnographic Klamath, from 6,500 to 4,500 B.P. (4,450 to 2,450 B.C.) extended or communal families occupied semisubterranean earth lodges in relatively permanent village locations (O'Connell 1975:50). Small game supplemented the hunting of mountain sheep and, to a lesser extent, bison, deer, and antelope (O'Connell and Hayward 1972:33).

About 4,500 B.P. (2,450 B.C.) this sedentary marsh orientation was replaced by a system with less stable settlements whose populations dispersed and recombined as resource availability dictated. The domestic household unit became nuclear families living in small brush wickiups. Year-to year population composition of villages became less stable and village locations were less permanent (O'Connell 1975:50). Big game importance decreased while that of small game increased. Waterfowl also entered the subsistence base (O'Connell and Hayward 1972:36).

O'Connell (1975:44–46) suggests that these social changes resulted from climatic change and/or the replacement of the Klamath-Modoc ancestral people by people ancestral to the Northern Paiute who were better able to deal with the changing environment. He speculates that

> the break in stylistic continuity across the northern Great Basin (including Surprise Valley) represents a population movement, with people from the central Great Basin displacing a different ethnic group along the northern rim of the Basin (O'Connell 1975:45).

Warner Valley

In the Warner Valley area of south-central Oregon, Weide (1968:222–264, 1974:71–78) identifies a settlement and subsistence system that included "the exploitation of adjoining but contrasting environmental zones, the marshes and slough of the valley floor and the open grassy reaches of the uplands." This system existed from about 3,450 to 1,350 B.P. (1,500 B.C. to A.D. 600). Semipermanent winter villages of 10–20 families were at the mouths of major streams and along Crump Lake. In spring and summer people dispersed to temporary camps of 4–10 people in the dune and slough topography of the valley floor. From these camps hunting parties made upland forays, camping at the edge of collapse lakes, springs, and knolls overlooking grassy swales.

Subsistence resources available from the dune and slough temporary camps include fresh water clams, chubs, tules, cattail, and waterfowl and their eggs. Grass seeds and roots may have been gathered but there was "no evidence of their being processed in quantity." The hunting and butchering of deer, antelope, and mountain sheep were the major tasks performed at upland camps (Weide 1974:74–76).

After 1,450 B.P. (A.D. 500) use of dune and slough sites decreased, upland swale and collapse lake sites were abandoned, and in general use of the upland at different sites increased. This apparently resulted from climatic change and a decreased productivity of marshes and lakes. The lake-marsh oriented settlement pattern was abandoned. This shift may have reflected a retreat of pre-Northern Paiute peoples and replacement by the Northern Paiute (Weide 1968:262–267). The earlier Warner Valley pattern, while "not different in kind" from the Desert Culture, did exhibit larger and more permanent villages and had both winter and summer settlements on the valley floor (Weide 1968:xvi).

Lake Abert

In the Lake Abert vicinity Pettigrew (1985:183–184) found evidence for a "sedentary or semi-sedentary society that maintained permanent and fixed settlements on the lakeshore" from about 3,500 to 500 B.P. (1,450 B.C. to A.D. 1450). Pettigrew terms this the Chewaucanian Culture. Thirty six prehistoric sites, most with associated rock art and 23 with circular features, were along the lake's east shore. Six sites were exclusively rock art.

The sites contain a diversity of artifacts including ground stone food processing equipment, a variety of flaked stone tools, heavy cobble tools, bone tools, bone beads, mussel shell disc beads, and *Olivella* shell beads (Pettigrew 1985:101–110). Vegetal foods including seeds and roots were suggested by the presence of the food processing equipment. These foods "were integral to the diet and perhaps even more important than animal products" (Pettigrew 1985:185).

The most frequent faunal remains found were those of lagomorphs (hares, rabbits, and pikas) and waterfowl, with deer, sheep, catfish, chub, and large freshwater mussels remains also recovered. Most identified land animals were those available close to the lakeshore and not those requiring forays elsewhere. Overall, faunal data showed "a high diversity of animals suggesting a flexible economic system that would have been adaptive to shifting abundances of the various available resources" (Pettigrew 1985:184–185).

The 23 sites with circular features contained 436 circular features including 390 circular depressions and 51 rock rings (Pettigrew 1985:183). Diameters ranged from 1.8 to 11.0 m (5.9 to 36.1 ft), a range reported to be "generally larger" than found elsewhere in the Great Basin except for the small Surprise Valley sample. The range "compared favorably with the sizes of ethnographic Klamath houses, which were approximately 4 to 11 [meters (13.1 to 36.1 ft)] in diameter according to Spier (1930:198)." The Lake Abert circular features probably represent "wintertime occupation" (Pettigrew 1985:185).

Rock rings were proportionately more frequent on the lake's upper terraces. Pettigrew (1985:186) suggests two explanations for this pattern: either "thinner soil and greater frequency of rock at the higher elevations influenced the choice of construction methods" or the differing proportions reflect "stylistic changes over time, since the higher terraces appear to possess generally older habitation debris."

Rock rings constitute a greater portion of circular features on the higher terraces than on the lower ones. Twelve sites had rock rings, three of these composed solely of one or two rings (Appendix B, Table B-5). For sites with rock rings, the rock rings make up 23.4 percent (50/214) of all circular depressions. For elevations below 9.5 m the percentage was 33.3, for elevations between 9.5 and 15.5 m the percentage was 23.3, and for elevations above 15.5 m the percentage was 49.0.

Later circular features on the lower terraces had more homogenous sizes than earlier ones on the upper terraces where the lower and higher ends of the size range are more frequently represented (Appendix B, Tables B-5 and B-6). Pettigrew (1985:186) offers a potential explanation:

> the upper terraces represent an early period of abundance when occupation intensity . . . was relatively great and social differentiation was at a peak . . . . [F]unctional and status diversity among . . . [circular features] would have been high, resulting in a greater range of . . . sizes . . . on the lower terraces . . . [These circular features] were created at a later time when environmental abundance was not as great, occupational intensity lower, and social structure was more atomized and egalitarian.

Contrary to the general trend for all circular features, when considered as a separate subset, a different pattern emerges for the rock rinds. Overall, the diameters of the rock rings ranged from 1.8 to 6.5 m (5.9 to 21.3 ft) with a mean of 3.9 m (12.7 ft) (Appendix B, Table B-5). However, mean sizes decreased with increased elevation (Appendix B, Table B-6).

Considering the effects of climatic change on the Chewaucanian Culture, Pettigrew (1985:193) speculates that "settlement location and economic activities . . . [at Lake Abert] were most strongly influenced by climatic alterations that caused significant variation in the lake's extent and concentrations of dissolved solids." The former variation influenced the size of "biotic populations" and "the lakeshore configuration." The latter affecfted "habitat suitability for plants and animals."

The Chewaucanian settlements along Lake Abert were abandoned about 500 B.P. (A.D. 1450) when lake levels and lacustrine food resources had apparently diminished and water had become non-potable. Pettigrew (1985:194) considers this the likeliest time for the arrival of the Northern Paiute.

Based on a reanalysis of the distribution of projectile points in relation to the lake terraces, the distribution of house features on the terraces, the archaeological evidence for higher Late-Holocene lake levels, and the location of dated sites in relation to freshwater sources, as well as a comparison of the Lake Abert data to hypothesized Lake Abert-Chewaucan Marsh Basin-wide settlement patterns (Oetting 1990), Oetting (1988:272-275) interprets the Lake Abert data differently than Pettigrew (1985). Rather than seeing "indications of smaller and possibly more mobile groups" during the latter part of the Late Archaic, Oetting sees the evidence as suggesting "increased population and sedentism." He asserts that rather than indicating an abandonment of the area by the ancestral Klamath-Modoc becuase of "environmental deterioration," the data suggest that they were "forced out by Northern Paiute aggression" and that the region remained disputed by both groups as recently as 120–300 years ago.

Goose Lake Basin
Investigations at the Burrell Site, a lowland occupation in the Goose Lake Basin, indicated early cultural ties with the Columbia Plateau around 6,500 B.P. (4,450 B.C.) followed by influences from the Great Basin after 4,000 B.P. (1,950 B.C.). These latter influences were reflected not only by projectile point types but also by the mano-metate and mortar-pestle complexes (Hughes 1977:72).

Most of the artifacts recovered from the Burrell Site were obsidian lithic items with some ground and pecked stone, bone and antler artifacts, and historic period items present (Hughes 1977:21–22). The subsistence economy focused on seeds, roots, and hunting with fishing of lesser importance (Hughes 1977:73–74). The site may also have functioned in later times, from 900 to 600 B.P. (A.D. 1,050 to 1,350) with

> some special purpose in connection with the manufacture of obsidian tools . . . . [O]bserved differences in obsidian refuse patterns . . . [are] the material correlate of the manufacture of large blades . . . for export to groups on the northwest coast of California (Hughes 1977:75–76).

Reconnaissance work in the uplands east of Goose Lake supports the view that "task specific" activities were carried out at sites in that area (Hughes 1977:77). On the west side of Goose Lake a housepit village with an associated petroglyph site has been reported for a former high strand of the lake. The location and characteristics of these sites suggest similarities with the Lake Abert area (Silvermoon 1985:154).

Kawumkan Springs
Cressman (1956) interprets the archaeological evidence from the Kawumkan Springs Midden and housepit sites above and below the confluence of the Sprague and Williamson rivers to indicate a long term stability in Klamath Culture. Cressman (1956:433) describes the artifact sequence as presenting a general "picture of a culture adapted to an ecological situation,

satisfied and conservative, gradually being exposed to external influences which it accepted and took over to a limited degree."

He attributes the specialized cultural development of the Klamath area "to the distinctive local ecological conditions and the gradual concentration of people on the exploitation of the riverine and marsh resources" (Cressman 1956:466).

Using typological crossdating, Cressman (1956:463–464) assigns dates of 9,500 to 7,500 B.P. (7,450 to 5,450 B.C.) for Kawumkan Springs' earliest levels. Projectile point reclassification and obsidian hydration analysis by Aikens and Minor (1978:2–10) results in a downward revision to 5,000 B.P. (2,950 B.C.) for the beginning of the major occupation at Kawumkan Springs. The obsidian hydration analysis does demonstrate the continuity of occupation determined by Cressman.

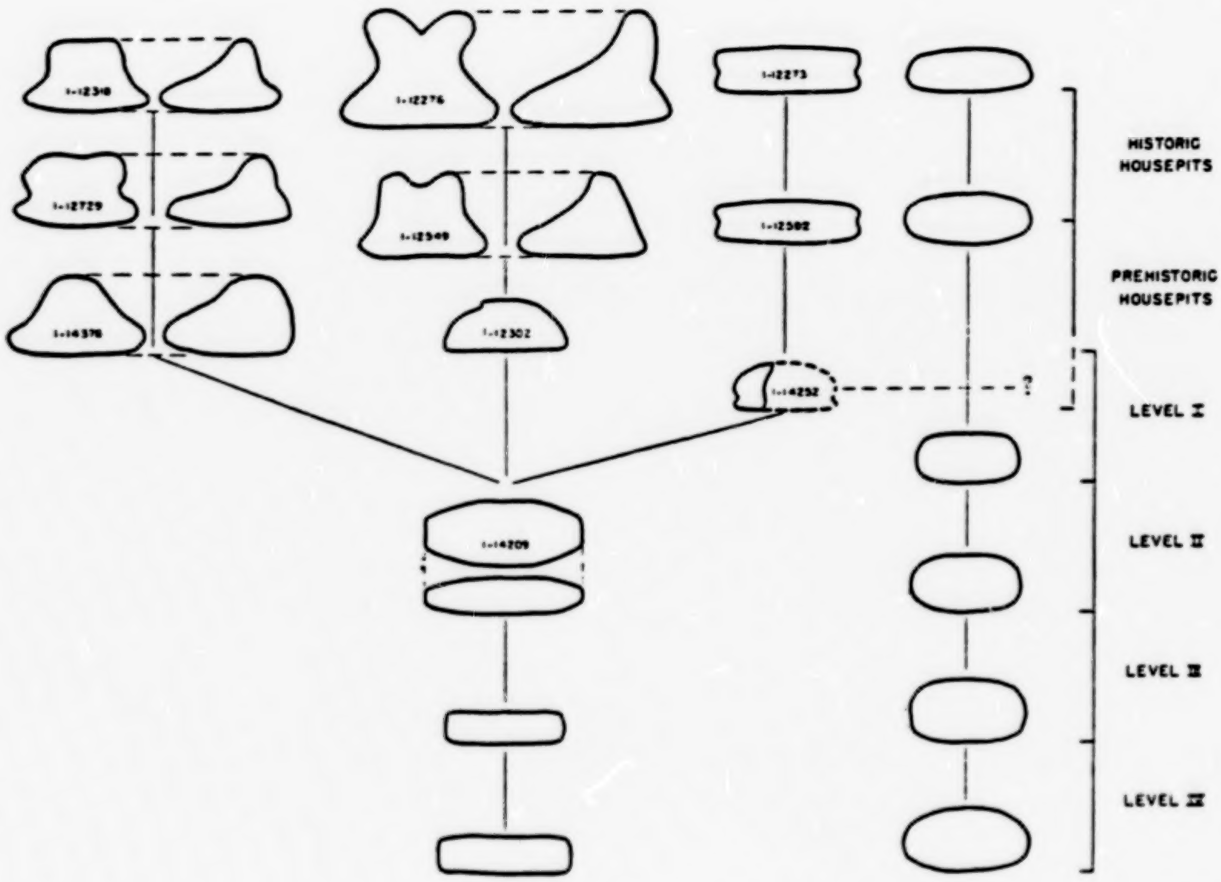
Aikens and Minor's (1978:2–4) projectile point reclassification yielded 16 types including Gunther Barbed, Desert Side-Notched, Cottonwood Triangular, Rose Spring Corner-Notched, Eastgate Expanding Stem, a triangular contracting-stem type, a triangular parallel-sided stem type, Elko Side-Notched, Wendover Side-Notched, Northern Side-Notched, Pinto Barbed, a slightly shouldered large foliate, thick chunky foliates, large single-shouldered points, Humboldt Concave-base, and Cascade. The reclassification and obsidian hydration analysis also indicates that

> while stratigraphic mixture has undoubtedly obscured important culture-historical details of the midden record, Cressman's basic perception of an internal development from lesser to greater utilization of riverine and marsh resources with no fundamental changes in the overall economic system, does not seem seriously threatened (Aikens and Minor 1978:4).

The midden's artifact inventory includes small spall scrapers made by retouching flakes, projectile points, manos and metates, choppers, mortars and pestles, "hot rocks," hammerstones, drills, bifacial knives, mauls, a graver, combination grinding tools and paint palettes, and enigmatic spindle-shaped basalt artifacts possibly used as household utensils, and atlatl weights or bola stones. Bone and antler objects include wedges, fleshers, a needle, a knife, a projectile point, gorges, harpoon parts, awls, flakers, and ornaments (Cressman 1956:410–432).

Two basic mano types were present. One is the general Great Basin type of an oval to round stone of fine-grained basalt. The other is a similar variety shaped to a flat surface on each side and made from a very light scoriaceous igneous rock or from very compact pumice (Cressman 1956:422). This type was more easily shaped and manipulated during use. It may have been used for fine grinding of seeds and was "developmentally ancestral" to the Klamath tool complex used for processing wokas (Figure 9) (Cressman 1956:454).

Figure 9 Klamath Mano Complex Developmental Sequence (from Cressman 1956:421).



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House pit artifacts show a "continuity of the traditions in stone work from the midden." The one significant difference is an increased variety of grinding tools, including a mano with "incipient horns," bell shaped manos, hemispherical manos, transverse ridged manos, and manos with fingertip grooves. These forms imply improvements for the more efficient processing of established foods and/or the use of new seeds. They were probably the result of internal cultural innovation and not diffusion. In Cressman's view (1956:446–448), the development of this special grinding tool inventory for the processing wokas "sharply sets the Klamath Culture off from that of the Great Basin."

The Kawumkan Springs Midden faunal and tool analysis indicates changes in the early subsistence pattern, with a pattern resembling that of the ethnographic Klamath becoming established by excavation Level II and stabilizing by Level I (the uppermost excavation level). These changes demonstrated a "gradual adaptation" to "riverine and marsh environments" (Cressman 1956:454).

The range of foods in the early levels was greater than that of later ones (Cressman 1956:450). Subsistence resources used in these levels showed an "approximation" to contemporary northern Great Basin people including the use of rodents and other small animals as well as seeds and roots (Cressman 1956:451, 454). While the relative importance of mussels was unknown, Cressman (1956:452) thinks they had a "very great significance" in all levels.

The "lack of a well developed scraper and knife complex" and the relative frequency of bones within and between levels indicated that game animals were never an important subsistence resource (Cressman 1956:432, 448–454). The incidence by levels of the mano-metate complex that would have been used to process primarily roots and secondarily seeds indicates the presence of a pattern of seed and root use in all levels (Cressman 1956:454).

A major subsistence pattern shift occurred between the third and second levels. Evidence for use of carnivorous game animals was nonexistent and use of rodents drastically decreased. Fish bones first appeared in the third level. By the second level fish showed evidence of being the dominant food resource and remained so until the midden's abandonment. Fish gorges and bone harpoon parts were also present in only the first three levels. Present in all levels, bird bones increased in frequency from the third to the first two levels, as did fish bones. Bird bones were second in importance to fish bones in the first two levels (Cressman 1956:450–454).

The earliest habitation structures found at Kawumkan Springs Midden were a "series of four artificial platforms built up out of stones of varying sizes" (Cressman 1956:445). Later ones were house pit structures.

In general within the region, villages were located on river terraces or benches. They were frequently located close to some river feature, such as a riffle, spring, or confluence with a feeder stream, which kept the river open and made it possible to fish in the winter when it was likely that elsewhere the river would freeze. House structures had a generally circular floor plan with the north-south axis usually slightly longer than the east-west axis, shallow saucer-shaped floors, and benches around the circumference. Post holes were rarely found and evidence concerning entrances was confusing: a roof ladder entrance was indicated for some but not all structures and one structure had a side entrance (Cressman 1956:445).

Two house size classes were discerned: a large 6–7 m (19.7–23.0 ft) diameter class and a smaller, probably ancillary, 3-4 m (9.8–13.2 ft) one. Diameters ranged from 2.4 to 19.10 m (7.9 to 62.3 ft), and depth ranged from 0.2 to 2.6 m (11.8 in to 8.5 ft) (Cressman 1956:435–436).

At lease one house structure was built with "a number of large stones that must have been used to hold down mats" (Cressman 1956:442). Cressman (1956:439) also states that it was possible "a more or less dome-shaped house was constructed in some cases using heavy willows . . .[that] if bound together . . . [gave] a remarkably strong base on which to place the outer covering. . . ."

Cressman (1956:445) concludes that the archaeological evidence for house structures shows "a distinct variation in detail from the pattern set up in the ethnographic sources." He infers that the "ethnographic pattern is the ideal one" and that the archaeological data shows the "behavioral variation."

Upper Klamath River Canyon

Synthesizing her own investigations (Mack 1983) and those of Gehr (1985, 1986) and Jensen (1987), Mack (1991) developed a cultural chronology for the Upper Klamath River Canyon (the Salt Cave Locality) indicating use of the area from about 7,000 B.P. (5,500 B.C.) to historic contact. Mack (1991:79–82) concluded that this was an area of "subsistence uniformity with variation in settlement patterns and cultural affiliations of the inhabitants throughout its prehistory."

Evidence dating to the canyon's earliest documented occupations indicates use by generalized hunter/gatherers who, as part of a seasonal round that included adjacent areas at other seasons, hunted turtles and mammals in the canyon. By about 5,950 B.P. (4,000 B.C.) the appearance of ground stone tools indicates the exploitation of seed plants. The appearance of specialized bone and antler tool kits for fishing between 4,450 and 2,200 B.P. (2,500 and 250 B.C.) indicates greater reliance upon river resources and suggests that base camps were present in the canyon (Mack 1991:77, 79).

The period from 2,200 B.P. (250 B.C.) to historic times saw a significant population increase for the canyon as evidenced by the number of housepit villages. During this period generalized hunting and gathering continued, but from year-round villages rather than from seasonal base camps. Bow and arrow dependence is indicated by the dominance of small, narrow-necked projectile points. Artifact assemblages, including specialized wocusprocessing manos, from the upriver sites in the canyon indicate a Klamath or Modoc affiliation. Artifact assemblages, including pottery identified as Siskiyou Utility Ware, from the downriver sites indicate a Shasta or Upland Takelma affiliation. The evidence also suggests the canyon's inhabitants traded with people both up and down the river (Mack 1991:77–79).

Medicine Lake Highlands and Lava Fields

Survey work in the Medicine Lake Highlands and lava fields adjacent to the Lava Beds National Monument resulted in the discovery of 768 sites, including semi-permanent camps, small lithic scatters, hunting blinds, quarry sites, and historic fortifications associated with the Modoc War of A.D. 1872-1873 (Hardesty and Fox 1974:16–22).

Semi-permanent camps tended to be near water sources and had a heavy concentration of cultural debris, including projectile points and/or tools such as scrapers, knives, and used flakes typical of a "butchering complex." Two sites had rock rings and one had mortar fragments and bedrock mortars. None of the sites appeared to have been base camps. The small lithic scatters or chipping stations had light concentrations of cultural debris with no or very few tools (Hardesty and Fox 1974:16–17).

Analysis indicated "differential use of microenvironments" (Hardesty and Fox 1974:47). Semi-permanent camps tended to be in "rushes microenvironments or adjacent to the mountain mahogany-bitterbrush zone in sagebrush microenvironments, a probable winter range for deer and other large mammals" (Hardesty and Fox 1974:51). These were probably areas in which hunting was concentrated (Hardesty and Fox 1974:47).

Seed collecting was concentrated in bunchgrass microenvironments near the south shore of Tule Lake, and quarrying was concentrated around the Glass Mountain Obsidian Flow and Grasshopper Flat, a buried obsidian flow in the Shasta-Trinity National Forest (Hardesty and Fox 1974:47–48). Semi-permanent camps, lithic scatters, and quarries were in the fir-lodgepole pine microenvironments and suggests summer use of the highlands for hunting and plant food processing (Hardesty and Fox 1974:47-48, 51).

Typological crossdating suggests a "long period of human occupation in the Lava Beds" beginning at a time corresponding to the early period at Nightfire Island (Hardesty and Fox 1974:49–50). The sites manifested "a mixture of northern California and Great Basin . . .[cultural] traditions" (Hardesty and Fox 1974:52).

Nightfire Island

An occupational sequence from about 6,950 to 550 B.P. (5,000 B.C. to A.D. 1400) has been documented for Nightfire Island at Lower Klamath Lake (Sampson 1985). The pioneer occupation involved the construction of the platform that was to become the island and the use of the site as a waterfowling station by single households of small hunting parties. Use was not seasonally restricted and the wide range of faunal remains and artifacts reflects a "fully matured mid-Holocene hunter-trapper-forager adaptation" (Sampson 1985:507).

Dryland hunting is indicated by lithic remains including unfinished unifacial and bifacial preforms and reshaped and resharpened points. Although mortars and pestles are present, the general paucity of grinding tools suggests that seed gathering was not a major subsistence activity at the site. This subsistence strategy continued until shortly after 5,700 B.P. (3,750 B.C.), when the site was abandoned for a short time following a warming and drying trend that resulted in the retreat of the shoreline (Sampson 1985:508–509).

About 5,450 B.P. (3,500 B.C.) the site was once again in a marsh environment, and it was reoccupied. Use at this time was primarily as a waterfowling station with some hunting and trapping undertaken. A more diverse plant food processing tool kit also appeared (Sampson 1985:509–511).

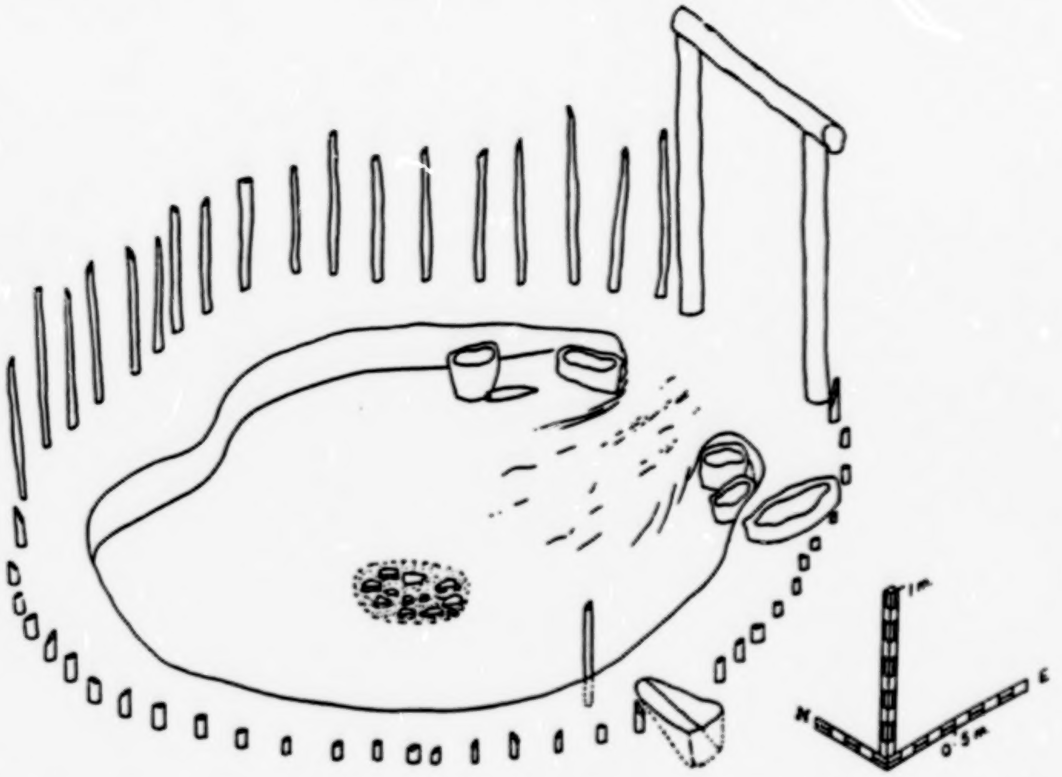
From 4,950 to 4,800 B.P. (3,000 to 2,850 B.C.) platform building intensified and the site was converted to a semi-permanent village. Food processing equipment increased, projectile points were more carefully finished, and clay-lined pit houses appeared. This period of increased sedentism came to an end about 4,450 B.P. (2,500 B.C.), when the site was abandoned for a short time as the shoreline once again retreated (Sampson 1985:511–512).

The most complete pit house remains, radiocarbon dated at 4,650 B.P. (2,700 B.C.), come from this period (Figure 10a). These remains show a structure that had a clay-lined pit with a diameter of about 3.5 m (11.5 ft) and a depth averaging 35 cm (13.8 in.) with a maximum depth of 52 cm (20.5 in.) below the clay rim. Several shallow, 3-cm-(1.2-in.)-deep depressions were apparently the imprints of large mortars. An ash-filled hearth was found in the center in a shallow depression with an arrangement of fire-cracked angular basalt fragments. A small triangular pit due south of the housepit may have had some ritual significance. The two excavated post holes within the housepit had diameters of 4.5 cm (1.8 in.) and a depth of 11.5 cm (4.5 in.) (Sampson 1985:431).

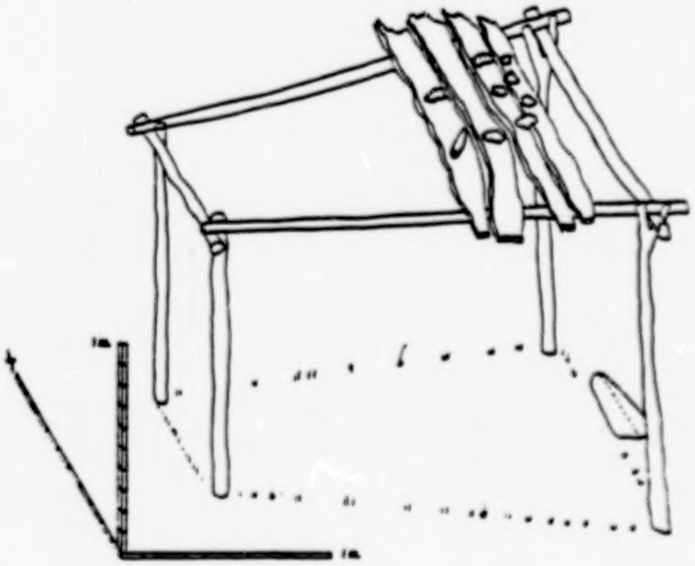
A minimal reconstruction of this pit house shows a frame of thin, bent poles covered with tule matting, an east entrance with a shallow ramp, mortars and pestles stored on either side of the door, and a 30–40 cm (11.8–15.4 in.) wide bench around the perimeter about 50 cm (19.7 in.) above the floor (Sampson 1985:431).

This pit house floor remnant was the only for which a Modoc analogue could be found. Its superstructure "could have resembled the domed-shaped hut . . . [of] a typical summer dwelling" (Sampson 1985:439). The interior layout resembled the Modoc mat-covered house used in the winter. These had a ramped entrance, an outer wall set back from the pit, a central circular fireplace, and areas by the door for storage. The superstructure was, however, different from Modoc forms. In addition, although clay was not used by the Modoc as flooring, it was used in this pit house "as a sealant to keep the house interior dry in a normally damp matrix." The pit house remains thus incorporated features of both the circular pit house and the rectangular mat-covered house of the ethnographic Modoc. Given that it was 4,000 years older than these ethnographic analogues, it is possibly an "ancestral form to later types" (Sampson 1985:440).

Figure 10 Reconstructed Houses from Nightfire Island (from Sampson 1985:432, 436).



a. Isometric cutaway diagram of the reconstructed E8 pit house, dated 4,650 B.P. (2,700 B.C.).



b. Tentative reconstruction of the burned house structure in E4b, dated 2,317 B.P. (367 B.C.).

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Nightfire Island was reoccupied about 4,400 B.P. (2,450 B.C.), and from that time until about 3,900 B.P. (1,950 B.C.) three shifts are seen in the adaptive strategy of the inhabitants. These shifts include an intensified exploitation of plant foods as reflected by an apparent increase in the use of grinding tools, the reestablishment of waterfowling activities, and the beginning of fish exploitation. This period reflects an increasing utilization of the resources in the immediate area (Sampson 1985:512).

Village use of the site continued through a subsequent warming and drying trend until the site was abandoned about 3,150 B.P. (1,200 B.C.). About 2,550 B.P. (600 B.C.) the site was reoccupied as changing climatic conditions restored lake levels. The clay-lined pit houses were replaced by "lighter surface structures," and exploitation of fish increased. A decreased habitation area, the absence of compacted living floors, and an increase in fish bone densities indicated that by 2,250 B.P. (300 B.C.) site function had shifted to that of a small, temporary summer fishing village (Sampson 1985:513–514).

The other most complete house remains from the site are dated to this period. These remains consists of timbers and fragmented poles from a burnt house structure (Figure 10b). A radiocarbon date of 2,317 B.P. (367 B.C.) was obtained from a burnt log. Although the remains evaded reconstruction, some structural details were discernable. These include two forked supports consisting of "two thicker poles" about 12 cm (4.7 in.) in diameter which "overlay a thinner . . .[about 7 cm (2.8 in.) diameter] pole at right angles to it" as well as a scattering of "burned basalt chunks, some of which rested on top of the timbers" (Sampson 1985:437). Sampson (1985:440) found the tentative reconstruction of this structure somewhat analogous to the superstructure of the Modoc earth-covered sweat lodge although its dimensions were half that of the sweat lodge, its clay floor was level, there was no trace of a pit, and some rocks were obviously on top of the superstructure rather than in it.

After a short abandonment from about 2,050 to 1,900 B.P. (100 B.C. to A.D. 50) the site was reoccupied with no apparent changes in the subsistence pattern previously followed. Burials are conspicuously present and the finding of arrowpoints among the bones suggests warfare and conflict. The introduction of the bow and arrow at about 1,650 B.P. (A.D. 300) was accompanied by the establishment of trading contacts with the Pacific Coast as evidenced by the appearance of *Olivella* shell beads and other marine shell items (Sampson 1985:514–515).

Structures were once again temporary and lacked a pit base. The presence of grinding equipment indicated that plant foods were a staple. After 650 B.P. (A.D. 1300) fish remains increased and the use of the site as a fishing camp is indicated with some harvesting, hunting, and waterfowling activities undertaken. Expanded trade is also indicated as evidenced by "exotic stone objects, dance knives, fancy arrowheads, ready-made bowls and platters," and pipes (Sampson 1985:515–516). Remains of fur-bearing animals increase in the cultural deposits and may reflect an "increased need for pelts as part of a wider exchange network" (Sampson 1985:168). Sometime after 550 B.P. (A.D. 1400) the site was abandoned for reasons that are unclear (Sampson 1985:515–516).

Several subsistence related trends are evidenced by the faunal record. The range of game indicated for Nightfire Island over the last 6,000 years was "essentially similar" to that procured by ethnographic Modoc except for the appearance of bison at about 6,400 B.P. (4,450 B.C.) and 2,250 B.P. (1,300 B.C.) and the abandonment of dog as part of the diet sometime after 1,450 B.P. (A.D. 500). Also, beginning about 4,800 B.P. (2,850 B.C.) there the use of elk steadily declined (Sampson 1985:167). Plant food processing was not demonstrably a significant part of the subsistence pattern until about 4,950 B.P. (3,000 B.C.) (Sampson 1985:229). A shift in waterfowl from diving to dabbling species is attributed to the maturation of Lower Klamath Lake, which was slowly being filled by bottom sediments and plant remains (Sampson and Greenspan 1985:302).

Sampson (1985:516) concludes that from its earliest occupation until about 5,700 B.P. (3,750 B.C.) Nightfire Island was used by a people just learning how to use the lake-marsh environment of the site. By 5,700 B.P. (3,750 B.C.) or shortly after, and most certainly after 1,900 B.P. (A.D. 50) and again after 650 B.P. (A.D. 1300), the site was used by a people fully adapted to lake-marsh environments (Sampson 1985:516).

THE GERBER RESERVOIR VICINITY

In 1982 the pond of Gerber Reservoir and a surrounding 0.4 km (0.25 mi) area were inventoried (Cannon 1984:2, 7). Fifteen prehistoric archaeological sites and two historical sites were located. Twelve prehistoric sites had "house rings" and associated lithic scatters and three were only lithic scatters (Table 2). One lithic scatter may be associated with a hunting blind.

Unpublished data indicates that rock rings are at 10 other sites in the reservoir's vicinity. In addition to these sites, Cannon (1984:13) reports a number of rock rings in the surrounding area, including rings near Dry Prairie, Big Adobe Reservoir, Round Valley Reservoir, the Bumpheads, and Antelope Flat.

Unpublished data also indicates the presence of lithic scatters and cambium peeled tree sites along the western edge of Dry Prairie. Eighteen lithic scatter sites of more than 10 artifacts, 31 isolated lithic scatters of 2 to 10 artifacts, 55 isolates, and two rock features were also recorded during a survey undertaken during the 1986 field season in forested uplands about 6.4 km (4.0 mi) east-southeast of the Peninsula Site (Appendix C). Rock rings have been reported for several other locations in this region including the northwest side of Dry Prairie and other meadow/prairie areas south and east of Yainax Butte, Barnes Valley, the Sycan Marsh, Foster Lake, Big Valley, and Goose Lake (Silvermoon 1985:130–134).

Cannon (1984:13–15) discoverd rock rings at or near water sources, often on canyon rims above a stream or on sheltered knolls around wet meadow margins. He describes them as ranging in size

> from less than two meters in diameter with walls less than twenty centimeters high, to six meters in diameter with walls over one meter high. They are constructed of loose piled, angular basalt stones. No mortar is used and the rocks are not shaped. The walls may be piled from one to several rocks high. The floors of the rings are often on bedrock but they can have up to one meter of fill. The rings do not appear to have a well constructed opening although some appear to have an opening on the east side. Some appear to have a juniper tree in the wall as if the ring was built around an existing tree.

Cannon considers these rings to be similar to rings in northern California, northern Nevada, and southeast Oregon. Their location, shape, and artifact content suggest they were "a form of warm to mild weather habitation" as also supported by ethnographic data.

In addition, a possible chute-and-pound antelope drive with rock walls and concentric rings having diameters of 3.0 m (10 ft) and 7.6 m (25 ft) has been reported for the area near Painter Springs, about 10 km (6.3 mi) north-northwest of the Peninsula Site. Also in this vicinity a possible cremation site was reported to exhibit concentric rings with fire-cracked rock, ash, and charred bone as well as stone piles, a stone ring, and a rock wall (Silvermoon 1985:131).

Cannon (1984:18–19) hypothesizes that the Gerber Reservoir area sites exhibit "a full range of activities" including hunting, plant processing, and fishing and that they reflect "a more family oriented occupation" with the "stone houses . . . most likely . . . to have been occupied during warm weather months." Observed projectile points and points reported by collectors indicate "a middle to fairly recent period of occupation of the region." Cannon (1984:16) suggests an occupation for the area from 4,500 B.C. (6,450 B.P.) to historic contact. Use of the sites was attributed to either the Klamath or Modoc.

Table 2 Recorded Archaeological Sites within about 10 km (6.3 mi) of the Peninsula Site, 35KL87 (compiled from Cannon 1984:8–13, Silvermoon 1985:130–131; and other previously unreported data).

Site[1]	Lithic Scatter	Ground Stone	Rock Rings	Size	Comments
35KL58	no	no	no	5 m^2	Petroglyphs
35KL59	yes	no	no	400 m^2	
35KL60	yes	no	no	625 m^2	
35KL64	yes	mano, metate	3-5	1.0 ha	
35KL65	yes	no data	no	no data	J Spring
35KL66	yes	no data	2	200 m^2	
35KL70	yes	no data	yes	no data	
35KL72	yes	no data	yes	no data	
35KL73	no data	no data	yes	no data	
35KL80	yes	no	2	3,740 m^2	Rings are possible
35KL84	yes	no data	3	200 m^2	
35KL86	yes	no data	3	1,500 m^2	
35KL87	yes	mano, metate, mortar	yes	3,000 m^2	
35KL219	yes	no	no	6,000 m^2	
35KL220	yes	no	2	50 m^2	
35KL221	yes	mortar	3	2,000 m^2	
35KL222	yes	hopper mortar	2	2,500 m^2	
35KL223	yes	no	no	1.8 ha	
35KL224	flakes	no data	4	no data	Round Valley Reservoir
35KL225	yes	yes	no	7,800 m^2	
35KL227	yes	no	no	300 m^2	
35KL283	yes	mano, pestle	no	2.0 ha	
35KL284	yes	no data	yes	11.3 ha	Rock rectangles and rings
35KL285	yes	mortars	yes	no data	
35KL302	no data	no data	2	46.5 m^2	Rock walls and concentric rings, possible chut-and-pound drive near Painter Spring
35KL305	yes	no	no	2.4 ha	Series of scattered mounds
35KL307	no data	no	3	2.8 ha	Concentric rings with fire-cracked rock, ash, charred bone, stone piles, stone rings, 1 x 30 m rock wall; possible cremation site near Painter Spring
35KL309	yes	no	no	9,000 m^2	
35KL310	yes	no	no	24.3 ha	
35KL607	no	no	no	no data	Rock wall hunting blind
35KL608	no	no	no	no data	One cambium peeled ponderosa pine
35KL609	yes	no	no	690 m^2	
35KL610	yes	no	no	240 m^2	
35KL611	no	no	no	no data	One cambium peeled ponderosa pine

Table 2. Recorded Archaeological Sites within about 10 km (6.3 mi) of the Peninsula Site, 35KL87 (continued).

Site[1]	Lithic Scatter	Ground Stone	Rock Rings	Size	Comments
35KL612	no	no	no	no data	One cambium peeled ponderosa pine
35KL613	yes	no	no	234 m^2	
35KL614	yes	no	no	625 m^2	
35KL615	no	no	no	no data	One cambium peeled ponderosa pine
35KL616	yes	no	no	4,000 m^2	
35KL617	yes	no	no	690 m^2	
35KL618	yes	no	no	1,800 m^2	
35KL621	no	no	no	no data	Two cambium peeled ponderosa pines
35KL622	no	no	no	no data	Four cambium peeled ponderosa pines
35KL623	no	no	no	no data	One cambium peeled ponderosa pine
35KL624	no	no	no	no data	Four cambium peeled ponderosa pines
35KL625	no	no	no	no data	Ten cambium peeled ponderosa pines
35KL699	dense	no	no	no data	Hunting blind present
35KL700	dense	metates, manos	7-8	7,500 m^2	
35KL701	15/m^2	no	2	5,000 m^2	Stone lined pit
35KL702	flakes	no	3	5,000 m^2	
35KL703	no data	no	1	625 m^2	
35KL704	<5/m^2	bedrock mortars	4	7,500 m^2	Several areas cleared of rock
35KL705	heavy	metates	3	3,750 m^2	Rings are possible
35KL706	100/m^2	no	7	3,750 m^2	Rings connected and walled
35KL707	light	metates	3	7,500 m^2	
35KL708	light	metate, mortar	4	7,500 m^2	
35KL709	10/m^2	metates	no	7,500 m^2	
35KL710	10/m^2	metates, manos	3	7,500 m^2	Battered cobbles, basalt cores
35KL711	light	no	1	7,500 m^2	
35KL712	<5/m^2	mortar	5	1,250 m^2	
35KL713	<5/m^2	metates, manos	2	625 m^2	Two edge-battered cobbles
B-2	yes	no	no	2,500 m^2	
B-3/4	yes	no	no	252 m^2	
B-5	yes	no	no	210 m^2	
B-15	yes	no	no	2,000 m^2	
B-16	yes	no	no	2,400 m^2	
B-25/26	yes	no	no	20,000 m^2	Multiple loci, possible historic artifacts
B-27	yes	no	no	1,950 m^2	
W-4	yes	no	no	5,000 m^2	
W-5	yes	no	no	500 m^2	
W-6	yes	no	no	1,000 m^2	

Table 2. Recorded Archaeological Sites within about 10 km (6.3 mi) of the Peninsula Site, 35KL87 (continued).

Site[1]	Lithic Scatter	Ground Stone	Rock Rings	Size	Comments
W-10	yes	no	no	5,000 m^2	
W-12	yes	no	no	825 m^2	
W-22+[3]	yes	no	no	30,000 m^2	Low density scatter
W-46	no	no	no	10 m^2	Two rock piles
W-53	yes	no	no	750 m^2	
W-60	no[2]	no	no	7 m^2	1.5 m long rock wall, possible hunting blind, two obsidian flakes
W-62	yes	yes	no	450 m^2	
W-79	yes	no	no	2,500 m^2	
W-80+[4]	yes	no	no	24,000 m^2	Low density, multiple loci scatter
W-81	yes	no	no	700 m^2	
W-99	yes	no	no	1,800 m^2	

[1] Site numbers beginning with a "B" or "W" were recorded during a survey undertaken during the 1986 field season in forested uplands about 6.4 km (4.0 mi) east-southeast of the Peninsula Site (Appendix C).

[2] Two obsidian flakes were observed at Site W-60, too few to classify it as a lithic scatter.

[3] Site B-22+ includes B-22, B-23, B-24, B-25, B-26, B-27, B-28, and B-29.

[4] Site W-80+ includes W-80, W-82, W-83, W-85, W-86, W-87, and W-88.

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5. METHODS

Archaeological fieldwork at the Peninsula Site, 35KL87, was carried out in four concurrent stages: a systematic survey and collection of surface-visible artifacts, recording of surface features, mapping, and excavation of selected spots. Post fieldwork tasks consisted of the development of maps, artifact analysis, and site evaluation.

Prior to the commencement of fieldwork, members of the field crew met with the chairperson of the Klamath Tribe as well as members of the Tribal Game Commission. A Native American archaeology student on the field crew helped facilitate communication with the Klamath Tribe and made a sage offering at the site prior to the commencement of work.

Calculations in the field were made by hand or with a Texas Instruments TI-36 solar scientific calculator. Calculations made during the analysis stage were made either by hand, with the calculator, or with a SuperCalc spreadsheet program on an Osborne Executive computer.

SURFACE SURVEY AND SURFACE COLLECTION

The first few days at the site were spent in a surface survey conducted using parallel transects 5.0 m (16.4 ft) apart. The site was walked from the southeast to the northwest end. This was repeated several times, with the transects focused on the terraces. Surface-visible artifacts were flagged as were bedrock features, circular rock features (CRF), rock art, and other rock features.

Flagging of lithic artifacts was limited to debitage concentrations, "finished" or "diagnostic" tools, and especially those artifacts thought to be susceptible to collection by artifact collectors. In addition, flakes along the site's peripheries were flagged to aid in determining the site's boundaries.

Surface-visible artifacts were collected when their locations were mapped, if their size and weight permitted. These were primarily lithic artifacts, which were given a designation of the letter "S" followed by a number. During the last few days of fieldwork a number of these artifacts were not mapped or collected because of time constraints. Artifacts picked up by visitors to the site, for which provenience was uncertain, were given letter designations corresponding to the initials of the person who picked them up.

RECORDING SURFACE FEATURES

Surface features were flagged in much the same way as surface-visible artifacts. Bedrock and boulder grinding features were designated with the letter "M" for mortar or "GS" for grinding surface. Enhanced depressions were assigned the letters "ED," circular rock features were designated "CRF" ("R" was also used as a shorthand designation in the field), petroglyphs the letter "P," and pit-and-groove rock art the letters "PG."

After the initial surface survey, additional surface features were noted and flagged. Bedrock and boulder grinding features were increasingly noted as the field crew learned to recognize them. This was especially true of undisturbed rock rings with low walls in vegetated areas. In addition, the use of a small whisk broom uncovered a number of bedrock and boulder grinding features. Bedrock and boulders in the vicinity of circular rock features were particularly examined by this method.

North-south and east-west dimensions of mortars, enhanced depressions, and pit-and-groove rock art, and the length and width of grinding surfaces were acquired by tape measure. Depths of these features were measured by stretching a string across their mouths and dropping a steel tape measure or ruler from the string to their deepest part. All measurements of these features were made by the assistant field director to ensure consistency in technique.

Circular rock feature (CRF) diameters were taken with the use of a compass and tape measure and included the north-south, east-west, northeast-southwest, and northwest-southeast axes of the CRFs. These diameters were measured from the inside edges of the interior of the CRFs. Diameter measurements for all CRFs were taken by the same people, once again, to ensure consistency in technique. The largest heights of some CRFs were also recorded. Exterior and interior dimensions of the rectangular rock feature were measured and recorded when the feature was drawn.

Rubbings were made of the petroglyphs by placing a large piece of drawing paper over the petroglyphs and rubbing a crayon over the paper. Photographs of the petroglyphs were taken late in the day when shadows enhanced their visibility.

Photographs were taken of nearly all surface features. Detailed drawings were made of one rectangular rock feature and selected mortars, grinding surfaces, and CRFs, particularly when excavation units were placed inside, adjacent, or near these features. In other cases rough sketches were made showing primarily the general shape and outline of the feature. Time constraints and the small field crew precluded detailed recording of all surface features.

MAPPING

Initially a plane table and alidade were used in site mapping, but when it became apparent that time limitations were paramount, a transit and stadia rod were used instead. With these instruments raw locational and elevational data were obtained for later use in making a topographic map.

A prime datum was established on the northwest edge of the site, and mapping proceeded from there to the southeast edge of the site. Additional instrument stations were established as mapping progressed. The location of these instrument stations are given in Table 3. Steel reinforcing bar 1.3-1.9 cm (0.5-0.75 in.) in diameter was pounded into the ground at these instrument stations. The rebar was spray painted orange to enhance its visibility.

Table 3 Coordinates and Elevations of Instrument Stations used in Mapping.

Datum	Coordinates	Field Elevation	Corrected Elevation
A	ONS/0EW	0.00	0.00
B	ONS/50E	+0.89	+0.89
C	80S/110E	+4.35	+4.35
D	47S/110E	+3.36	+3.36
E	140S/170E	+6.46	+6.46
F	47S/142E	+0.76	+0.76
G	200S/170E	+8.28	+8.28
H	200S/230E	+6.29	+6.29
I	200S/260E	+4.53	+1.41
J	240S/275E	+3.45	+2.46
K	191S/255E	+4.80	+1.68
L	200S/275E	+2.03	-1.09
M	267S/255E	+9.36	+6.24
N	170S/230E	+5.22	+5.22
O	300S/275E	+7.65	+3.89
P	300S/345E	+2.48	-1.28
Q	350S/355E	+4.35	+0.59

Back sighting to previously established instrument stations, especially the prime datum when possible, helped to minimize error due to drift. A magnetic anomaly was discovered when an attempt was made to establish an instrument station at 260S/230E. Backshooting from this station to instrument station H, 200S/230E, proved to be futile as the compass on the transit behaved erratically. The indicated north direction from 260S/230E showed a 5.5° difference from the south direction obtained shooting from instrument station H, 200S/230E, to 260S/230E. AT 290S/230E the error was still present although reduced to three degrees. Using a hand held compass in this area revealed that the variation in degree readings was inversely related to the height at which the compass was held from the ground surface.

Consequently, a decision was made to extend the grid from instrument station H by extending the grid line farther east to instrument station L at 200S/275E, near the reservoir's edge, before shooting south again. This avoided the magnetic anomaly. The presence of the magnetic anomaly might indicate that readings elsewhere were distorted. A margin of error in bearings up to 3° over distances of 60 m (196.8 ft) has been accepted as tolerable in mapping. It is possible that some of this accepted error was due to magnetic disturbances rather than solely to human error.

A cartesian grid system was established for the site with the prime datum designated 0 North/0 South. All elevations were referenced to this prime datum. Stakes with their upper portions painted blue or orange were used to mark the grid. Where rocks prevented placement of stakes, blue or orange spray paint was used to mark an "X" and the grid coordinates at the desired location.

When the raw field data were later used to develop the site map, it was found that the elevation of several of the instrument stations had been incorrectly determined in the field. Table 3 lists the field elevations and the corrected elevations for these instrument stations. These errors were particularly frustrating in that two of the instrument stations with inaccurate elevations were the instrument stations from which elevation data were recorded for the excavation units placed inside CRF 15. The elevational data derived from these two instrument stations were, however, internally consistent.

Polar coordinates and elevations were obtained for surface artifacts and features. In the mapping process these were converted to rectangular coordinates. Only the center points of the interior of circular rock features were mapped with the transit and stadia rod. Aerial photographs and USDI Bureau of Reclamation topographic maps of Gerber Reservoir were used to tie the site into the surrounding area.

EXCAVATION PROCEDURES

Excavations began in the northwest part of the site. Subsequent excavations occurred to the southeast as mapping in that direction progressed. Excavation units were either 50 cm (19.7 in) square or 1 m (3.28 ft) square, depending on location. Surface collections were made from areas in which the backdirt from excavation units was to be placed.

The first units excavated were a 50 cm unit (11.5N/34.5E) placed inside and a 50 cm unit (16N/38E) placed just outside a large and unique rectangular rock feature in the northwest part of the site. The location of the unit within the feature was determined by gridding the feature into 50 cm squares and then selecting the unit by using the random number generator on the hand-held field calculator. The location of the other unit was selected randomly in a similar manner using gridded areas outside the feature. Only areas without large rocks and capable of being excavated were considered for selection. The gridded areas from which the second unit was selected included the area encompassed by grid lines 14-18N/34-36E, 12-16N/28-30E, 12-14N/24-28E, and 0-10N/22-26E.

Elsewhere in the northwest portion of the site a 50 cm unit (23.5N/1.5E) was placed in a relatively undisturbed portion of CRF 1, adjacent to Mortar 1, which was inside the CRF. A second 50 cm unit (23.5N/2E) was placed adjacent to the first when it became evident that the area was indeed relatively undisturbed. This was done to obtain a larger artifact sample from the feature.

A 50 cm unit (75.5S/144.5E) was placed in an area thought to be a possible midden deposit just east of CRF 10 and several other large disturbed CRFs. This unit's location was randomly selected from within an area bounded by grid lines 70-80S/140-150E. It was hoped that material recovered might yield information relevant to determining the nature of the disturbed CRFs nearby.

A 50 cm unit (47S/146E) was placed in another possible midden area along the slope leading down to Gerber Reservoir. This unit was designed to determine whether cultural debris had accumulated downslope from the CRFs above. Its location was determined in a random manner similar to that of the other 50 cm units. This unit was selected from the area defined by grid lines 40-50S/140-150E.

A 1 x 1 m unit (47S/145E) was placed adjacent to the 50 cm unit at 47S/146E. This unit location was selected because of the relatively high amount of cultural debris being recovered from the 50 cm unit and to aid in the determination of the depth of cultural debris in this area; it was not possible to excavate the smaller unit to a sterile level because it was too small.

Two 1 x 1 m units were placed inside CRF 15. Unit 197S/260E was placed in the approximate center of the ring. Unit 195S/260E was placed near the edge of the CRF to determine whether posthole remains were present.

One 50 cm unit (197.5S/271.5E) was placed downslope of CRF 15 to determine whether cultural debris discarded from the ring was present. The location of this unit was randomly determined in a manner similar to that of the other 50 cm unit and was selected from the area encompassed by grid lines 195-205S/270-275E. The area was adjusted to avoid the necessity of using time to remove brush piled up when the surfaces of CRFs 15 and 21 were cleared.

Time constraints, the small size of the field crew, and the extensive work necessary just to record features and map the site contributed to the tendency to take less detailed field notes than was ideally desirable. These also prevented subsurface sampling of the terraces in the southeast portion of the site.

All units were excavated in arbitrary 10 cm (3.9 in.) levels to sterile or near sterile levels or to the point where large rocks prevented further excavation. Most of the 50 cm units were excavated in levels parallel to the ground surface. The 1 x 1 m unit at 47S/145E was also started in this manner. A switch was made to excavating levels with reference to the elevation of the northwest corner of the excavation unit because this method was simpler and saved time. The other 1 x 1 m units and the 50 cm unit at 197.5S/271.5E were excavated in this manner.

All fill was screened through 1/4 in. (6 mm) mesh screens. When possible, artifacts were point provenienced and elevations taken, particularly for units placed within CRF 15.

Organic debris and charcoal were collected and bagged separately. Fill from intra-unit features was screened separately.

Wall profiles were drawn and photographs taken of the east walls of the 1 x 1 m units. Column samples of 5 x 5 x 10 cm (2 x 2 x 3 in.) were also taken from the east walls of these units. Floor drawings and floor photographs were taken for each level of all excavation units.

Approximately 0.525 m^3 of fill was excavated from the 50 cm units and 1.2 m^3 of fill was excavated from the 1x1 m units. Total fill excavated was about 1.725 cubic meters.

ARTIFACT ANALYSIS

Artifact analysis was accomplished through hand sorting and typing through visual means of the cultural debris recovered. Each artifact was examined with the use of a 10x power hand-held lens.

Organic debris was first separated from the collection. Then the collection was sorted into two general artifact categories. The first category includes artifacts primarily resulting from flaking and that are not cobble tools. The second category includes flaked and unflaked tools made from cobbles or large flakes from cobbles of non-glassy igneous rock (basalt and basalt-like rocks). The flaked cobble tools of this category include cores and those tools that, although they may have been flaked, were shaped and/or used in scraping, grinding, hammering, pounding, abrading, or rubbing. The former artifacts were termed "flaked lithics" and the latter "shaped and unshaped non-glassy igneous tools."

Flaked lithics were separated according to material type: obsidian, cryptocrystalline silicas (CCS), non-glassy igneous rock (basalt and basalt-like), and petrified wood. Each artifact was also measured for size by placing it on concentric circles with diameters ranging from 1 to 10 cm in 1 cm increments. Flaked lithics were divided into tool and debitage categories on the basis of use wear and/or intentional retouch. Debitage was then placed in one of the following categories: primary cortex flakes, secondary cortex flakes, interior flakes, flake fragments, and angular waste or debris. Debitage was weighed according to material type and unit/level.

Tools showing only use were separated from those showing edge or surface retouching. Use wear was identified as to location and type. Wear types identified include nibbles, snap fractures, step fractures or stepping, grinding, rounding, and polishing. Working edge shape and mean working edge angle were also determined. Angles were measured using a goniometer, and the average of two or more measurements along an edge was recorded.

Where an artifact exhibited more than one used or worked edge and/or had apparently been used or remodified for two or more functions, it was placed in all the applicable tool categories. Flaked lithic tools that showed substantial modification were weighed separately and measured for length, width, and thickness. These tools were primarily projectile points, bifaces, and unifaces. Fragmentary measurements are indicated in this report by an asterisk.

The shaped and unshaped non-glassy igneous tools were divided into categories according to shape, nature of intentional modification if present, nature of use wear, and used edge or surface. These categories included pestles, mauls, hammerstones, edge abraders and edge altered cobbles, bifacial hammer-pecking-abrading-rubbing stones, unformed or minimally formed hammer-anvil-rubbing stones, handled manos, unhandled manos, and spheroids (hopper mortar bases, deep mortars, and enhanced depressions were identified in the field). Measurements taken included length, width, and thickness. Additional features relevant to each tool type were also noted including working edge location and shape, use wear, number of faces, longitudinal and transverse profile of used facets, shape, and the presence or absence of ground or rubbing facets, shoulders, handles, and flaked or pecked finger depressions.

Of particular use in analyzing the non-glassy igneous tools were Trygg's (1971) classification scheme for Modoc and Northern Paiute ground stone and cobble tools, Pettigrew's (1985) definition of ground stone tools, and Hayden and Nelson's (1981) classification of tools used in the manufacture of manos and metates. Also of use were consultations with Eric Bergland and Lee Spencer. Assistance in the identification of floral remains was given by Guy Prouty.

References in this report to collected specimens are made according to a five part labeling system. The first part is the Oregon State Museum of Anthropology accession number for the site collection: "626." The second component is the numeric component of the site number: "87." The third and fourth components indicate provenience by unit and level. (The unit number designations for the artifacts collected conform to locations listed in Table 4.) The last designation is a unique specimen number in sequence beginning with "1" for the first artifact in a particular unit and level given a number. Thus, artifact 626-87-9-1-9 refers to the ninth artifact number from level 1 of unit 9, which was a 1 x 1 m unit placed at 197S/260E. For randomly collected surface artifacts the first two components of the labeling system are as described but the last three components are replaced by two components: the letter "S" denoting surface and a unique specimen number for the artifact.

A number of abbreviations have been used in this report, particularly in the tables, to designate material type, tool type, and use wear and/or modification. Those designations not specifically explained in the text or tables are listed in Table 5. Tools made of non-glassy igneous rock are generally identified as being of basalt or basalt-like material.

Finally, unless otherwise indicated by a scale, all artifact sketches are actual size.

Table 4 Numeric Designations of Controlled Surface Collection and Excavation Units.

Numeric Designation	Unit	Unit Dimensions
1	23.5 North / 1.5 East	50 x 50 cm
2	23.5 North / 2.0 East	50 x 50 cm
3	11.5 North / 34.5 East	50 x 50 cm
4	16.0 North / 38.0 East	50 x 50 cm
5	47.0 South / 145.0 East	1 x 1 m
6	47.0 South / 146.0 East	50 x 50 cm
7	75.5 South / 144.5 East	50 x 50 cm
8	195.0 South / 260.0 East	1 x 1 m
9	197.0 South / 260.0 East	1 x 1 m
10	10.5 North / 34.0 East	50 x 50 cm
11	197.5 South / 271.5 East	1 x 1 m
12	10.5 North / 34.5 East	50 x 50 cm
13	11.0 North / 34.0 East	50 x 50 cm
14	11.0 North / 34.5 East	50 x 50 cm
15	12.0 North / 34.0 East	50 x 50 cm
16	16.0 North / 32.0 East	50 x 50 cm
17	16.0 North / 37.0 East	50 x 50 cm
18	16.5 North / 37.5 East	50 x 50 cm
19	16.5 North / 38.0 East	50 x 50 cm

Table 5 Key to Selected Designations Used in Analysis and Reporting.

Type	Abbreviation	Description
Material	Obs	Obsidian
	Bst	Non-glassy igneous rock (basalt and basalt-like rocks)
	CCS	Cryptocrystalline silicas
	PW	Petrified Wood
Tool	UFUF	Unifacially used flake
	BFUF	Bifacially used flake
	FU	Flake uniface
	FB	Flake biface
	UB	Unformed biface
	OFB	Other formed biface
	DR	Drill
	PP	Projectile point
	CR	Core
	BFHPAR	Bifacially formed hammer-pecking-abrading-rubbing stones
	UFHPAR	Unformed or minimally formed hammer-anvil-rubbing stones

OBSIDIAN ANALYSIS

Thirty two pieces of obsidian debitage, in two batches of sixteen each, were submitted to Biosystems Analysis, Inc. for obsidian hydration and X-ray fluourescence analyses. Their reports are Appendix D. The initial problem to be addressed through these analyses was whether or not the northwest cluster of Circular Rock Features (CRFs) at the site are older than the southeast cluster CRFs (See Chapter 6). Sixteen pieces of debitage were submitted for analysis, 8 from 10–20 cm below surface in the two 50 x 50 cm units excavated in CRF 1 of the northwest cluster and 8 from 20–30 cm below surface in the two 1 x 1 m units excavated in CRF 15 of the southeast cluster. These depths are the deepest from which cultural debris was recovered from these units. The sample includes the four largest pieces of debitage from each level.

Once the first 16 pieces of obsidian had been analysed, an additional 16 pieces were submitted for analysis. This sample came from 0–10 cm below surface in the same units as the initial sample. This second sample includes the four largest pieces of debitage from the 0–10 cm level. The data from the analysis of the inital sample showed a larger obsidian source variability in the southeast portion of the site. In order to eliminate sampling error as an explanation for this result, the second sample was submitted for analysis. In addition, the initial data indicated no significant temporal difference between the southeast and northwest portions of the site. The second sample was intended to test if this held true for a sample from the shallowest excavated levels which are presumably more recent than the deeper levels.

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6. ROCK FEATURES AND ROCK ART

The Peninsula Site stretches for about 600 m (2,000 ft) on a generally southeast-northwest trending line along the shores of Gerber Reservoir (Figure 11). The most visible manifestation of the site are 28 roughly circular rock features, along with bedrock mortars and grinding surfaces, petroglyphs, and lithic artifacts, scattered on the site's surface. The bulk of the surface-visible features and cultural debris is in a 60-m-(200-ft)-wide area along the site's long axis. Clusters of ponderosa pine, juniper, and other vegetation inhabit this area. To the southwest is an area of rocky soil covered with sagebrush and associated vegetation. Lithic debris is scattered across this area about half way to the more heavily vegetated area about 160 m (500 ft) to the southwest.

The site's core area encompasses about 36,000 m^2 (3.6 ha or about 8.9 ac). Including the area of scattered lithic debris to the southwest increases the site area to 48,000 m^2 (4.8 ha or about 11.9 ac). Both the site's core area and total area are greater than any other recorded site within 10 km (6.3 mi) (Table 2). Most of the more visible circular rock features have been heavily disturbed and there is substantial evidence of subsurface disturbance. Local informants also indicate that the surface of the site has been heavily collected (Slyvia Gerber Livingston, personal communication 1986). Many of the less visible circular rock features do not appear to have been disturbed and, except in the area adjacent to the petroglyphs, there is little evidence that areas away from the more visible circular rock features have been subjected to subsurface disturbance.

CIRCULAR ROCK FEATURES

Twenty eight roughly circular rock features were recorded at the Peninsula Site. Eight of these appear to have had little or no disturbance, three have had some disturbance but retain some apparently undisturbed parts, and 17 have had substantial to severe disturbance (Table 6).

Characteristics of Circular Rock Features

The diameters of circular rock features range from 1.3 to 9.2 m (4.3 to 30.2 ft). The mean of the diameters is 4.33 m (14.2 ft). For the site as a whole the variance of the diameters of these features is 1.45 m and the standard deviation is 1.21 m (Table 7).

The circular rock features at the Peninsula Site seem to fall into two clusters. In the northwest portion of the site the diameters of these features cover a wider range than in the southeast portion of the site. In the former area are found the smallest and largest circular rock features. The mean of the diameters of the 16 circular rock features found in the northwest portion of the site is 4.43 m (14.5 ft), a little higher than the figure for the total site. This contrasts with a mean of 4.20 m (13.8 ft) for the circular rock features in the southeast portion of the site (Tables 7 and 8).

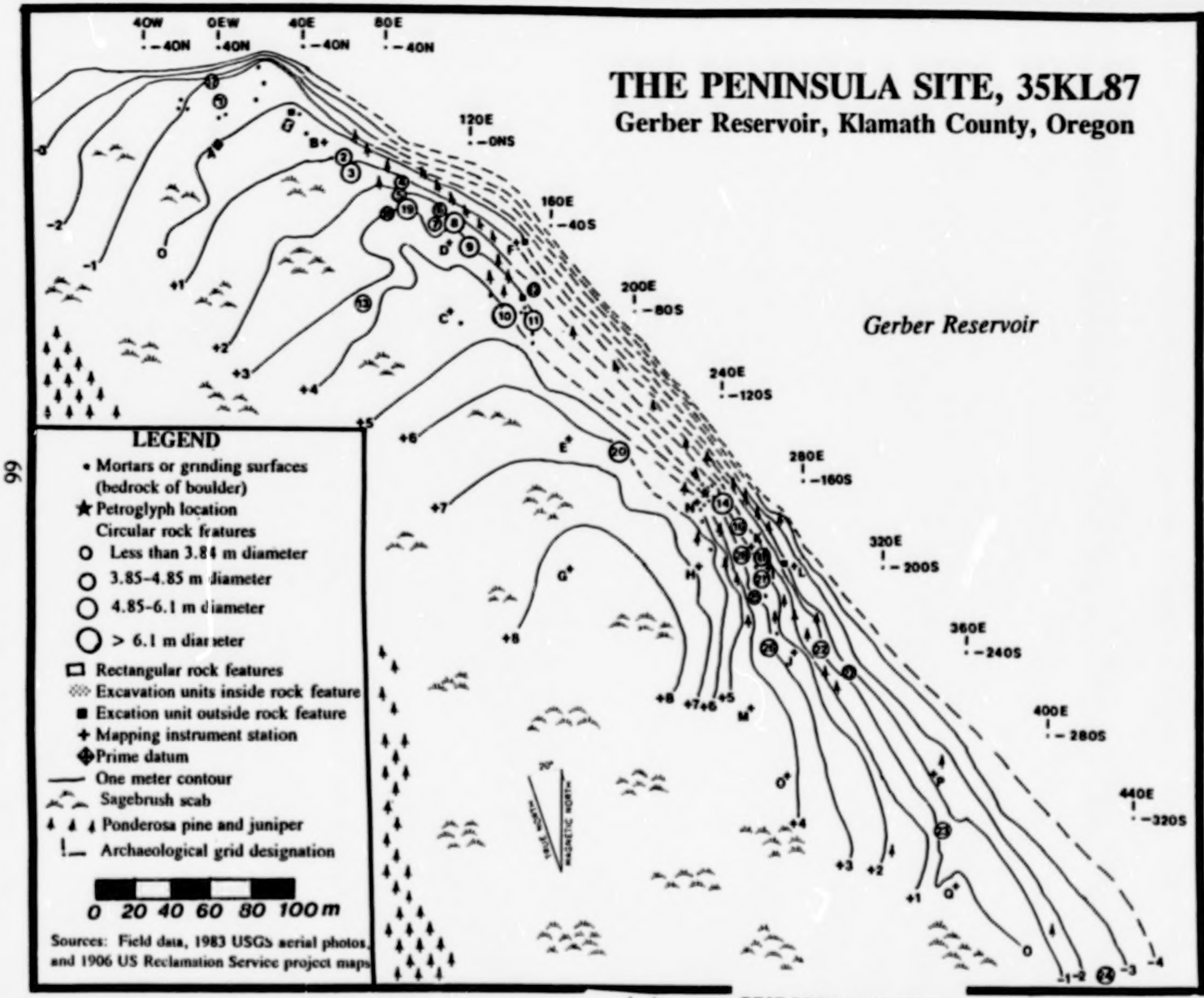
THE PENINSULA SITE, 35KL87
Gerber Reservoir, Klamath County, Oregon
Gerber Reservoir
40W
0EW
40E
80E
40N
120E
0NS
160E
40S
200E
80S
240E
120S
280E
160S
320E
200S
360E
240S
400E
280S
440E
320S
LEGEND
Mortars or grinding surfaces (bedrock of boulder)
Petroglyph location
Circular rock features
Less than 3.84 m diameter
3.85-4.85 m diameter
4.85-6.1 m diameter
> 6.1 m diameter
Rectangular rock features
Excavation units inside rock feature
Excation unit outside rock feature
Mapping instrument station
Prime datum
One meter contour
Sagebrush scab
Ponderosa pine and juniper
Archaeological grid designation
0 20 40 60 80 100 m
TRUE NORTH
MAGNETIC NORTH
20°
Sources: Field data, 1983 USGS aerial photos, and 1906 US Reclamation Service project maps

Figure 11 Peninsula Site Map.

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Table 6 Location and Condition of Circular Rock Features.

Designation		Center		Mean	
CRF	Feature	Coordinates	Elevation	Diameter	Condition
1	13	22.5N/3.2E	1.04 m[1]	3.55 m	Minimally and very disturbed
2	15	6.2S/59.5E	1.18 m	4.18 m	Very disturbed
3	16	12.0N/63.4E	1.98 m	4.93 m	Very disturbed
4	18	17.5S/89.1E	1.50 m[1]	3.23 m	Very disturbed
5	19	24.0S/89.3E	2.27 m	3.48 m	Very disturbed
6	22	35.4S/104.9E	2.42 m	3.35 m	Very disturbed
7	21	30.3S/105.2E	2.25 m	3.38 m	Very disturbed
8	23	36.1S/112.3E	2.55 m	5.05 m	Minimally disturbed
9	24	48.2S/121.9E	2.75 m	5.48 m	Severely disturbed
10	25	80.7S/138.0E	4.19 m	8.73 m	Very disturbed
11	26	83.7S/151.8E	3.89 m	6.05 m	Very disturbed
12	26	67.5S/152.2E	2.00 m	3.75 m	Minimally disturbed
13	32	No data	No data	4.63 m	Very disturbed
14	29	169.3S/239.5E	1.50 m	5.50 m	Severely disturbed
15	30	193.0S/260.4E	1.22 m	3.85 m	Very disturbed
16	31	181.5S/248.4E	0.67 m	4.00 m	Minimally to very disturbed
17	14	29.0N/1.5W	0.52 m[1]	2.13 m	Minimally to very disturbed
18	34	31.5S/87.4E	2.78 m	3.53 m	Very disturbed
19	20	30.0S/91.7E	2.92 m	5.48 m	Very disturbed
20	33	145.6S/193.3E	5.99 m	5.45 m	Very disturbed
21	49	205.9S/261.0E	1.66 m	3.90 m	Minimally disturbed
22	50	229.9S/289.8E	-1.23 m	4.28 m	Undisturbed
23	51	326.8S/348.4E	0.33 m	4.38 m	Very disturbed
24	53	392.6S/427.3E	-2.45 m	4.23 m	Severely disturbed
25	54	211.9S/258.5E	2.60 m	3.53 m	Minimally disturbed
26	55	228.7S/265.2E	2.08 m	3.98 m	Undisturbed
27	57	250.4S/303.6E	-0.46 m	3.45 m	Minimally disturbed
28	66	193.8S/251.5E	2.28 m	3.93 m	Minimally disturbed

[1] These estimates are derived from circumferential elevation rather than center elevation.

Table 7 Statistical Analysis of Circular Rock Feature Clusters.

	Site Area		
Circular Rock Features	Northwest	Southeast	Total Site
Number	16	12	28
Minimum diameter (m)	1.30	3.00	1.30
Maximum diameter (m)	9.20	5.80	9.20
Range of diameters (m)	7.90	2.80	7.90
Mean of diameters (m)	4.43	4.20	4.33
Variance	2.25	0.39	1.45
Standard deviation	1.50	0.62	1.21

The differences between these two areas of the site are more striking when the variance and standard deviation of the mean of the diameters are compared. For the northwest cluster the variance and standard deviation are 2.25 m and 1.50 m, respectively, while in the southeast cluster they are much smaller, 0.39 m and 0.62 meters. The mean of the diameters for the southwest cluster ranges only 2.80 m (9.2 ft), from 3.0 to 5.0 m (9.9 to 19.0 ft).

These statistical differences between the circular rock feature clusters are graphically represented in Figure 12. This figure presents the division of the circular rock features into three size classes. The interval for these classes was selected so that the number of circular rock features falling into each class for the site as a whole would be as equal as possible. This was accomplished by grouping the features according to whether their mean diameters were more than 5/12ths of a standard deviation less than the mean of the mean diameters for the total site, within 5/12ths of a standard deviation from that mean of means, or more than 5/12ths of a standard deviation greater than that mean of means.

Several statistical tests were used to assess the significance of the differences observed between circular rock feature clusters. The small sample size of these features resulted in some of the tests not being particularly sensitive. Statistical tests that found no significant differences between the clusters included Wilcoxon's sum of ranks test, Siegel and Tukey's modification of Wilcoxon's sum of ranks test, the Z test, and a t test. Use of Fishers chi square test, however, indicated a difference at a significance level of .02 (Table 9).

Other differences were observed for the circular rock feature clusters. Those in the northwest part of the site tended to be more exposed and in rocky areas than those in the southeast. In addition, the height of the walls tended to be greater in the northwest cluster than in the southeast cluster (Table 10). However, wall height measurements were not taken for all the circular rock features, and many of those for which measurements were taken had been severely disturbed, making the original wall height uncertain.

Table 8 Analysis of Diameters of Circular Rock Features.

	Number		Diameter in Meters						
Area of Site	Ring	Feature	N-S	E-W	NE-SW	NW-SE	Mean	Max	Min
Northwest,	1	13	3.6	3.6	3.6	3.4	3.55	3.6	3.4
N=16	2	15	4.8	3.9	4.7	3.3	4.18	4.8	3.3
	3	16	5.3	5.6	3.2	5.6	4.93	5.6	3.2
	4	18	3.3	3.2	3.4	3.0	3.23	3.4	3.0
	5	19	3.6	3.1	3.4	3.8	3.48	3.8	3.1
	6	22	2.5	3.3	3.9	3.7	3.35	3.9	2.5
	7	21	2.8	4.3	3.1	3.3	3.38	4.3	2.8
	8	23	4.9	5.4	5.5	4.4	5.05	5.5	4.4
	9	24	6.2	4.6	5.0	6.1	5.48	6.2	4.6
	10	25	8.3	8.9	9.2	8.5	8.73	9.2	8.3
	11	26	5.9	6.4	6.9	5.0	6.05	6.9	5.0
	12	27	4.2	3.9	3.5	3.4	3.75	4.2	3.4
	13	32	5.6	3.6	4.3	5.0	4.63	5.6	3.6
	17	14	1.3	2.8	2.0	2.4	2.13	2.8	1.3
	18	34	3.4	3.7	3.5	3.5	3.53	3.7	3.4
	19	20	5.6	5.8	4.9	5.6	5.48	5.8	4.9
NW Minimum			1.3	2.8	2.0	2.4	2.13	2.8	11.3
NW Maximum			8.3	8.9	9.2	8.5	3.73	9.2	8.3
NW Range			7.0	6.1	7.2	6.1	6.60	6.4	6.1
NW Mean			4.46	4.51	4.38	4.38	4.43	4.9	3.76
Southeast Area	14	29	5.6	5.7	5.8	4.9	5.50	5.8	4.9
N=12	15	30	4.2	3.0	3.9	4.3	3.85	4.3	3.0
	16	31	3.9	4.2	3.5	4.4	4.00	4.4	3.5
	20	33	4.9	5.7	5.5	5.7	5.45	5.7	4.9
	21	49	4.6	3.2	3.9	3.9	3.90	4.6	3.2
	22	50	4.1	4.4	4.1	4.5	4.28	4.5	4.1
	23	51	5.3	3.3	4.6	4.3	4.38	5.3	3.3
	24	53	4.5	3.9	4.3	4.2	4.23	4.5	3.9
	25	54	3.7	3.4	3.4	3.6	3.53	3.7	3.4
	26	55	4.0	3.9	4.3	3.7	3.98	4.3	3.7
	27	57	3.2	3.4	3.2	4.0	3.45	4.0	3.2
	28	66	4.0	4.2	4.0	3.5	3.93	4.2	4.0
SE Minimum			3.2	3.0	3.2	3.5	3.45	3.7	3.0
SE Maximum			5.6	5.7	5.8	5.7	5.50	5.8	4.9
SE Range			2.4	2.7	2.6	2.2	2.05	2.1	1.9
SE Mean			4.33	4.03	4.21	4.25	4.20	4.60	3.76

Figure 12 Distribution of Circular Rock Features into Three Size Classes Based on a Size Interval of 5/12ths of a Standard Deviation from the Mean of Diameters.

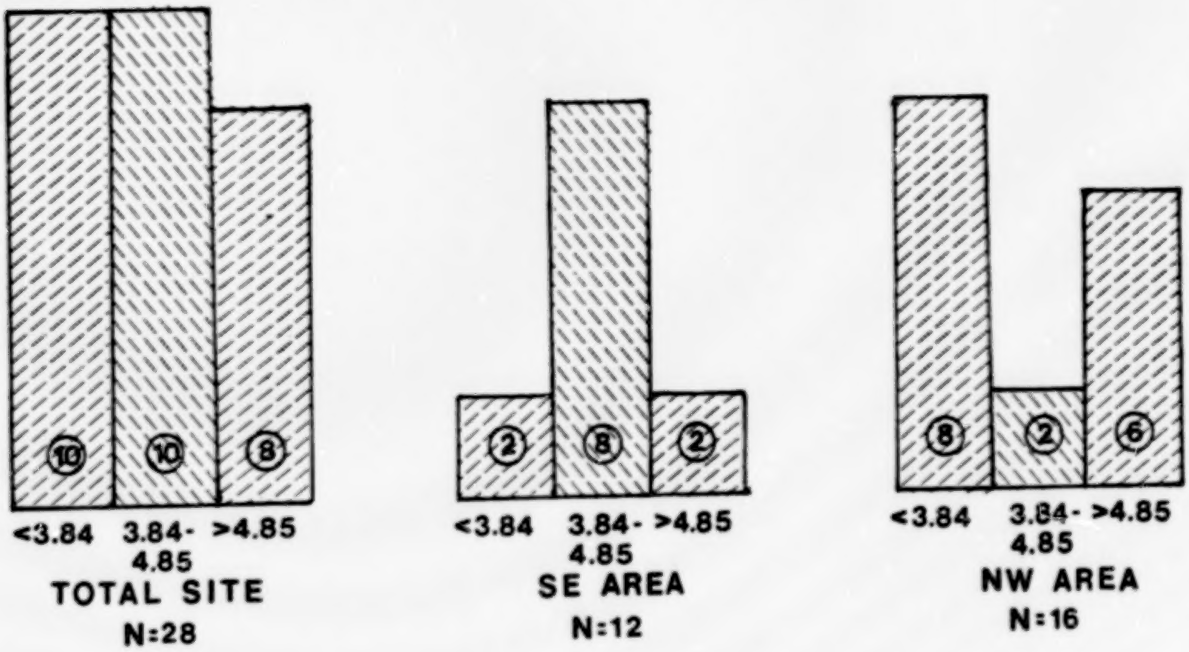

Table 9 Results of Analysis of Circular Rock Feature Clusters using Fishers Chi Square Test.

Circular Rock Feature (CRF) Cluster	Number of CRFs with a standard deviation size difference from the site mean	
	Greater than 5/12	Less than 5/12
Southeast, N=12	4	8
Northwest, N=16	14	2
Total Site	18	10

Chi square equals 6.562, Significance at P = .02 (5.41)

Table 10 Wall Heights of Circular Rock Features.

Cluster	CRF Number	Wall Height	Comments
Northwest	1	40-60 cm	
	2	80 cm	Southeast wall
	3	80 cm	Remnant
	4	75-85 cm	South wall, bedrock boulders
		20-40 cm	West and north wall
	5	100-120 cm	South wall bedrock boulders, west wall stacked rocks
	6	No data	
	7	No data	South wall corner boulder
	8	40 cm	
	9	No data	
	10	No data	Large boulders
	11	110 cm	
	12	No data	West wall bedrock boulders
	13	70 cm	
	17	No data	
	18	No data	South wall bedrock and stacked rocks
	19	120 cm	
Southeast	14	No data	
	15	30 cm	West wall
	16	100 cm	East wall bedrock and boulders
	20	40-50 cm	South wall, east-southeast wall boulders
	21	No data	
	22	15 cm	
	23	No data	
	24	No data	
	25	No data	
	26	No data	
	27	No data	
	28	No data	

Several circular rock features in both areas of the site had bedrock mortars and/or grinding surfaces within or adjacent to them (Figures 13 and 14; Appendix A, Figures A-2 and A-3). Excavation units were placed in two of the circular rock features: CRFs 1 and 15 (Figures 13 and 14; See Figure 15; Appendix A, Figure A-3, and Appendix F for a report on subsequent excavations in CRF 21). Analysis of the depth of provenienced artifacts from CRF 15 is highly suggestive of the presence of at least two living floors (Table 11). These living floors appear to be at about 6.6 to 11.5 cm (2.6 to 4.5 in.) below the surface and about 12.6 to 17.0 cm (5.0 to 6.7 in.) below the surface.

The remains of two posts were found in CRF 15. The smaller of these was about 2 cm (0.8 in.) in diameter, and the larger was about 7 cm (2.8 in.) in diameter. The smaller was fragmentary, being only about 2 cm (0.8 in.) in length. The other post was more complete, first observed about 7 cm (2.8 in.) below the surface and continuing downward for about

Figure 13 Circular Rock Feature 1.

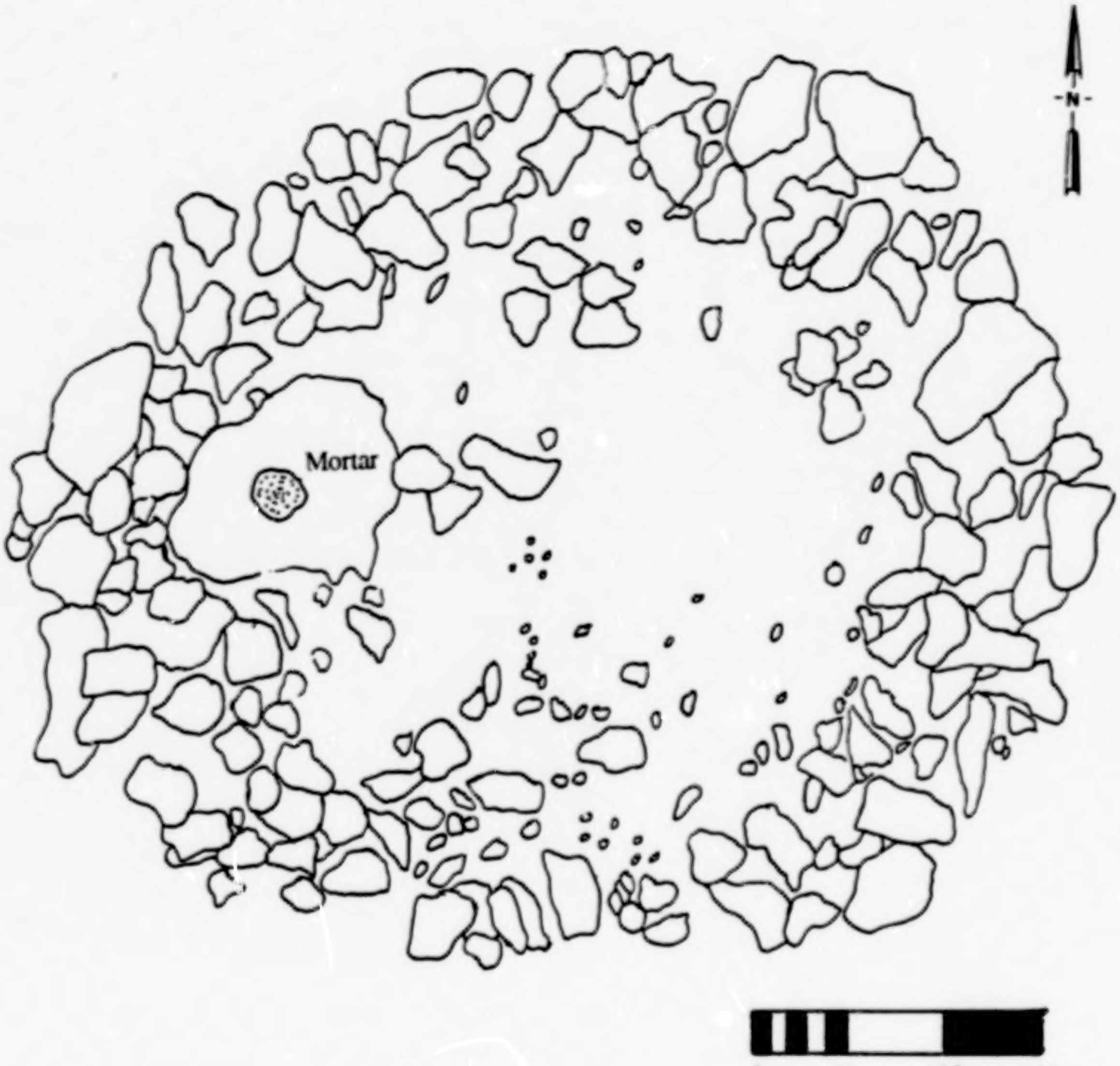

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Figure 14 Circular Rock Feature 15.

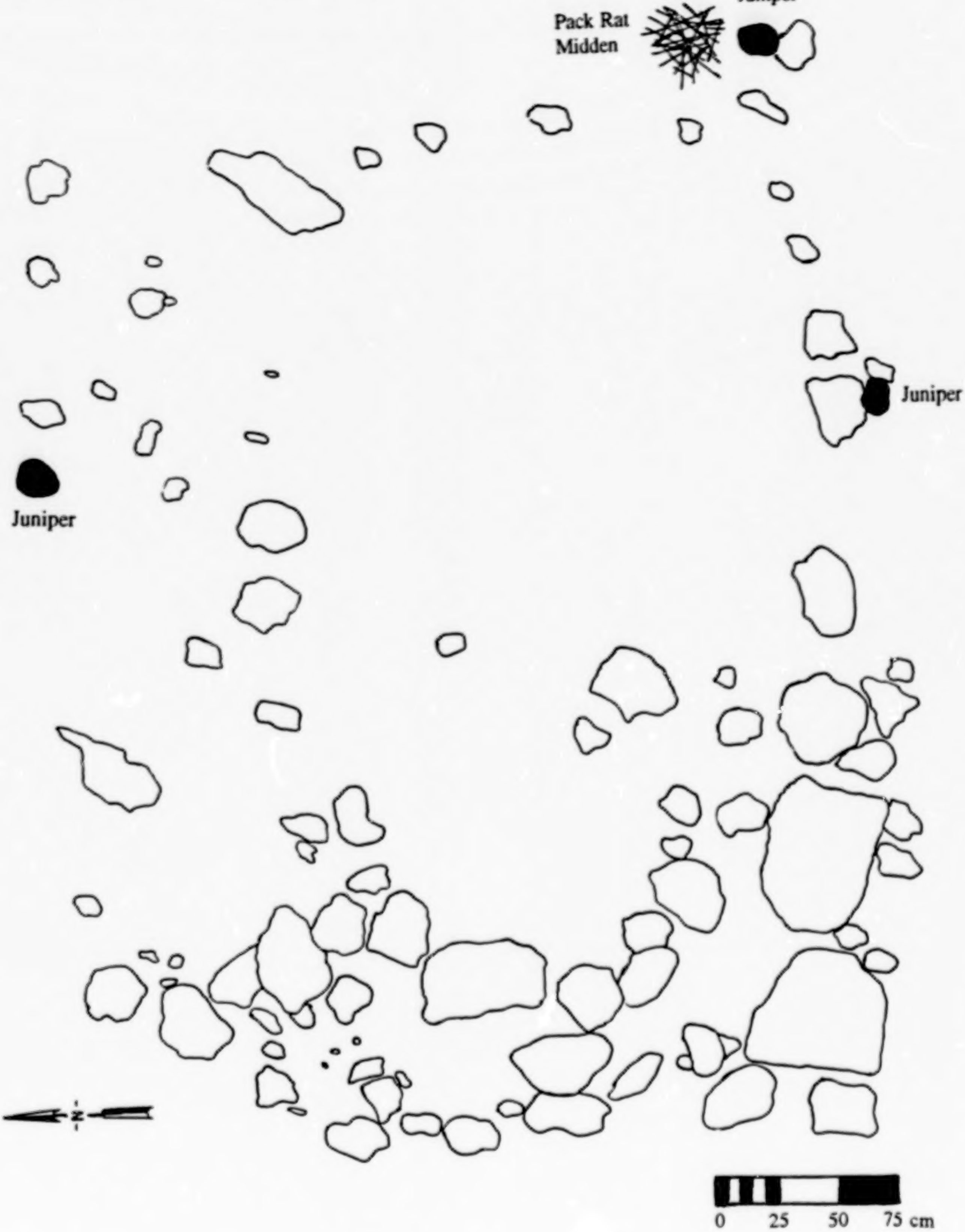

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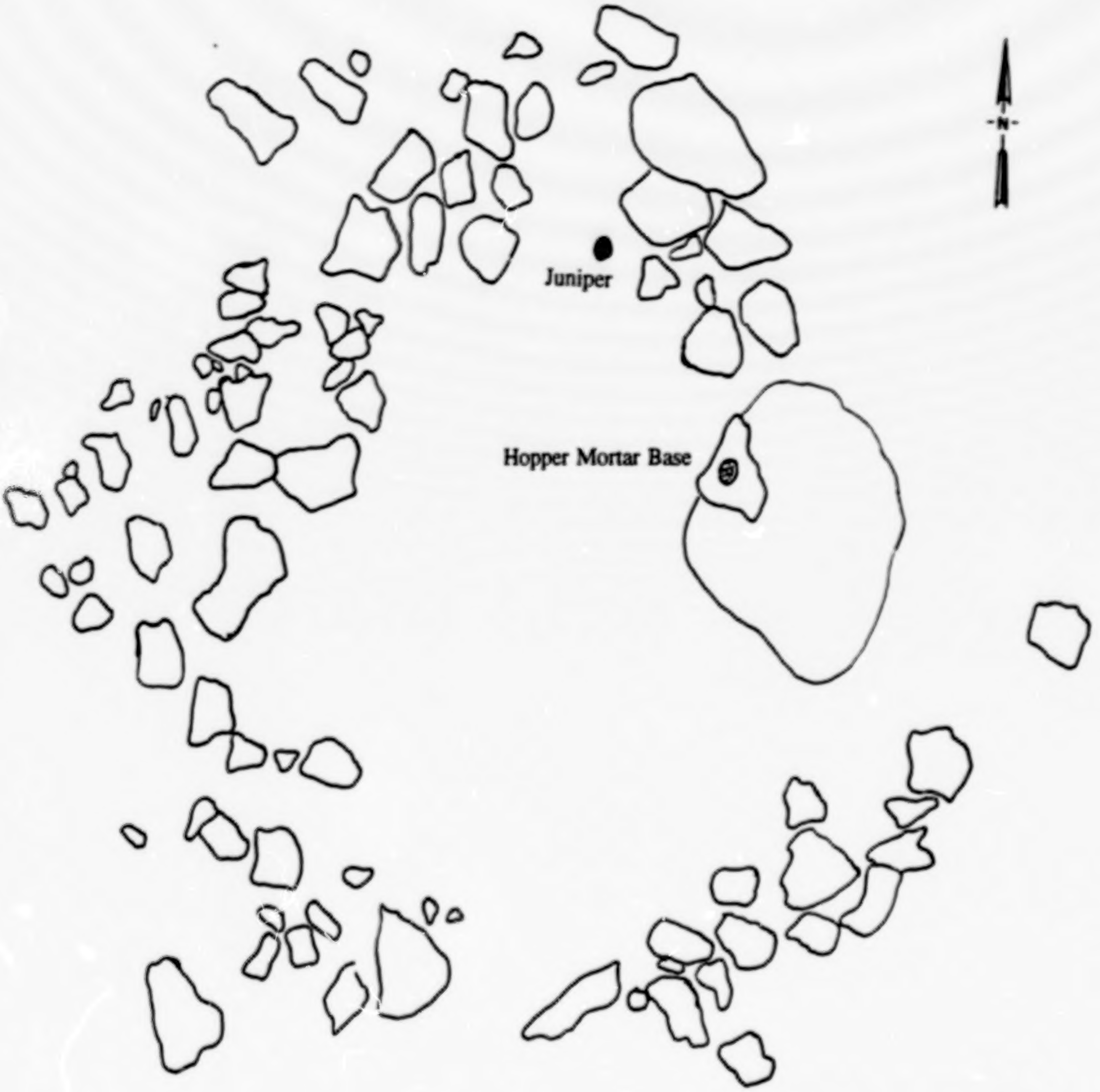
Table 11 Depth from surface of provenienced artifacts from units 195S and 197S/260E, circular rock feature 15, Peninsula Site, 35KL87.

Depth (cm)[1]	195S/260E	197S/260E	Both Units
1.0		x	x
2.5	x		x
6.5-7.0	x		x
7.1-7.5	xx		xx
7.6-8.0	xxxx		xxxx
8.1-8.5	xx		xx
8.6-9.0	xxx	x	xxxx
9.1-9.5	x	xx	xxx
9.6-10.0		xx	xx
10.1-10.5		xx	xx
10.6-11.0		x	x
11.1-11.5		x	x
11.6-12.0			
12.1-12.5			
12.6-13.0		x	x
13.1-13.5		xx	xx
13.6-14.0		xx	xx
14.1-14.5		xxx	xxx
14.6-15.0		x	x
15.1-15.5		x	x
15.6-16.0		xx	xx
16.1-16.5		x	x
16.6-17.0		xxx	xxx
17.1-17.5			
17.6-18.0		x	x
18.1-18.5			
18.6-19.0			
19.1-19.5			
19.6-20.0	x		x
20.1-20.5			
20.6-21.0		x	x
21.1-21.5			
21.6-22.0			
22.1-22.5		x	x
33.5-34.0		x[2]	x[2]

[1] Depth calculated from elevation of surface of nearest corner or center of unit from artifact, no artifacts recovered from 2.5-6.5 cm and 22.5-33.5 cm below surface.

[2] The artifact from 33.5-34.0 cm below surface probably was inaccurately recorded as it was recovered from the second level, 10-20 cm below surface.

Figure 15 Circular Rock Feature 21 (See Appendix F for a report of subsequent excavations in this feature).



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15.6 cm (6.1 in.). Both posts were found along the north wall of CRF 15 (Appendix A, Figure A-4).

Given the ethnographic and archaeological record reviewed above for south-central Oregon and northeastern California, it seems very probable that the circular rock features at the Peninsula Site represent the remains of habitation structures. The circular rock features of the southeast cluster resemble the ethnographic summer shelters of the Modoc described previously in this report. The circular rock features of the northwest cluster, however, do not appear to have direct ethnographic analogues. The heights of the walls also seems to be greater than would have been required of a circle of rocks used to hold down mats or secure willow poles. The larger circular rock features exceed the 3 m (10 ft) diameter of Modoc summer dome-shaped houses as reported by Ray (1963:156-157).

As the ethnographic review showed, Ray (1963:204) notes that in permanent winter villages one or two houses were considerably larger than the others and that these were the "homes of village leaders or shamans" and were gathering places for "religious and political purposes." CRF 10 had an average diameter 2.4 m (7.9 ft) larger than any other circular rock feature. This might reflect the social differences noted by Ray for Modoc house sizes.

Moratto (1984:439) indicates that in northeastern California the "pit-earth lodge" sometimes had a "lava rock parapet wall . . . where digging was difficult." It is possible that a similar situation might have faced the prehistoric inhabitants of the Peninsula Site. The ground on which the larger circular rock features are located is quite rocky with very thin soils, and excavating a pit would have been difficult if not impossible. Rock walls may have been substituted for the earthen walls of a pit-house.

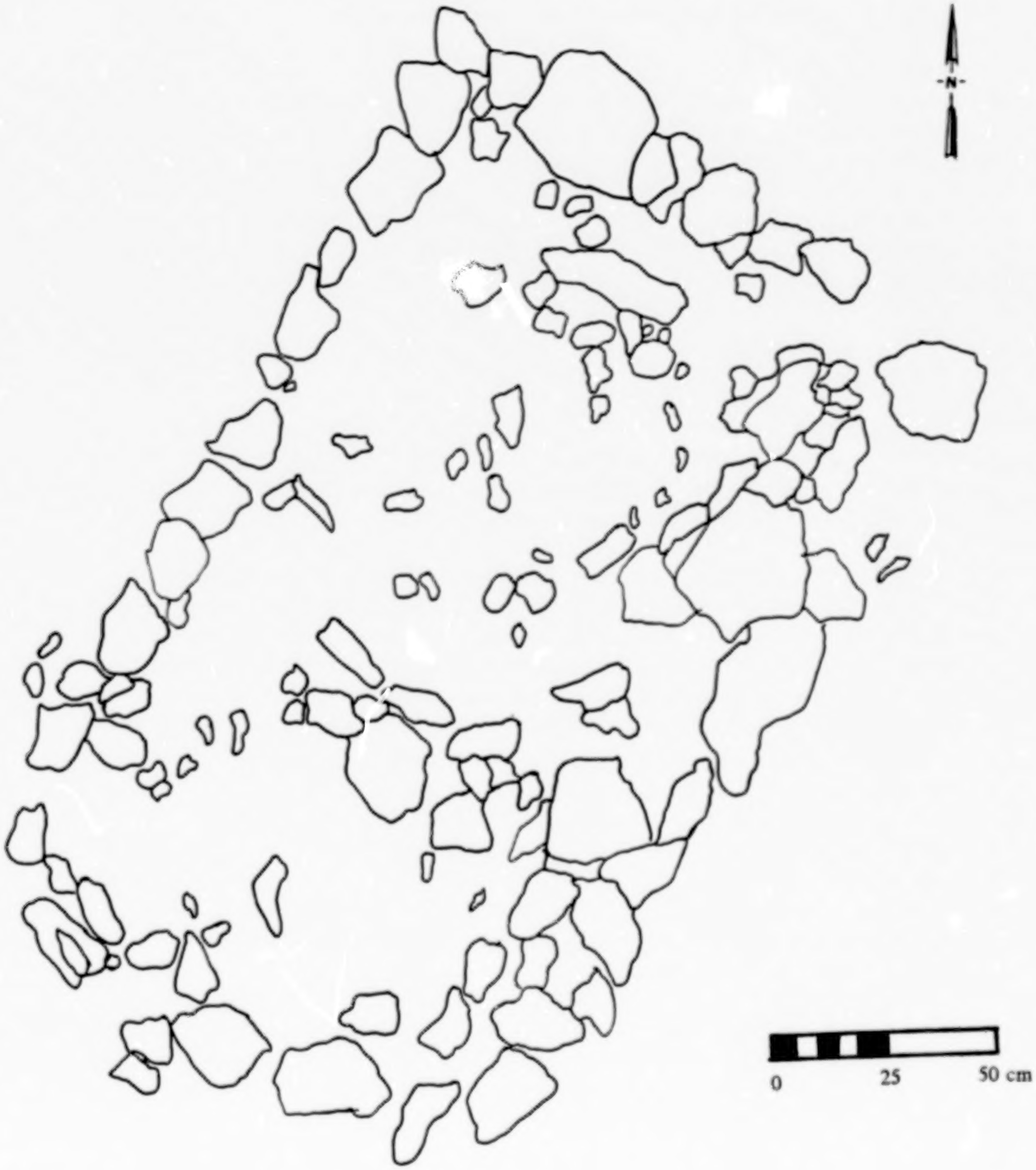
In addition, it is important to note that some of the larger circular rock features had common walls with smaller ones. These included CRFs 4, 5, and 19, as well as CRFs 2 and 3. The smaller adjacent rock features may be the remains of utility structures as mentioned ethnographically. Subsidiary structures were often located adjacent to or near earth lodges and mat houses used during the winter.

RECTANGULAR ROCK FEATURE

One rectangular rock feature (Feature 12) was found at the Peninsula Site. This is a low-walled structure on the rocky flat in the northwest part of the site. It is about 1.5 m (4.9 ft) wide and 3.0 m (9.8 ft) long. A low rock wall cuts across the width of the rock rectangle, dividing the feature in two, one section being about twice the length of the other (Figures 16 and Appendix A, Figure A-5).

Lithic debris was scattered on the surface of the rectangle's interior and adjacent areas outside. No grinding features were found inside this rock rectangle. Recent disturbance to the feature was evidenced by a number of rocks with exposed unweathered surfaces. This

Figure 16 Rectangular Rock Feature (Feature 12).



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feature does not seem to have any clear ethnographic analogues; however, it does somewhat resemble the ethnographic Modoc earth-covered sweat lodge. It is not as large nor does it have the earth-covered lodge's trapezoidal shape and shallow pit.

Excavation unit 11.5N/34.5E, a 50 x 50 cm unit, was placed inside the rectangular rock feature. A second unit, 16.0N/38.0E was placed just outside this feature. Cultural debris was recovered to 20 cm below surface from both units. Despite the obvious disturbance to some of the rocks constituting this feature, there is no conclusive evidence to suggest that it is not of prehistoric origin. Indeed, the presence of subsurface cultural debris within the feature is supportive of such an origin. The lack of clear ethnographic analogues or similar archaeological finds makes it difficult to draw any further conclusions concerning the rectangular rock feature.

ROCK ART

Three rock art features were found at the Peninsula Site, all in the same general area at the northwestern edge of the southeast cluster of circular rock features (Figure 11). These include two petroglyph panels and a grouping of pit-and-groove rock "art." Surrounding them are a number of bedrock or boulder mortars and metates.

One petroglyph panel, Feature 68, is on a large boulder (Figure 17 and Appendix A, Figure A-6). Also present on this boulder is a mortar (M 23). The grooves of these petroglyphs are 3-7 mm deep. This panel consists of a number of elements including circles, connecting circles, concentric circles, circle and dot motifs, and wavy lines. Stylistically the elements seem to fiy the Great Basin Curvilinear Abstract Style defined by Heizer and Baumhoff (1962:205-207). This panel includes three parallel rows of wavy lines, below which are various circle elements. These elements resemble an abstract bird image when combined.

The second petroglyph panel, Feature 69, is along the base of a rock rim about 2 m (6.6 ft) from the first panel (Figure 18 and Appendix A, Figure A-7). This panel is more extensive and complicated than Feature 68. In addition to the elements noted for the boulder petroglyph panel, the rimrock petroglyphs also have dot elements. The elements of this panel are combined or closely spaced to one another.

At the base of the boulder on which the first petroglyph panel was located is a smaller rock with what appears to be pit-and-groove rock art. This was recorded as Feature 46 and consists of seven small, circular pits with mean diameters ranging from 1.75 to 6.25 cm (Table 12). These pits are connected by small grooves.

Great Basin abstract styles are thought to be associated with pre-Numic (Paiute) peoples (Heizer and Baumhoff 1962:14-15; Heizer and Clewlow 1973:25). Heizer and Baumhoff (1962:197-199, 235) date this style between 2,950 and 450 B.P. and the pit-and-groove style

Table 12. Pit-and-Groove Rock Art.

Designation		Diameter (cm)				Depth (cm)
PG	Feature	Maximum	Minimum	Max-Min	Mean	
PG1g	**46**	**2.0**	**1.5**	**0.5**	**1.75**	**no data**
PG1d	**46**	**3.0**	**3.0**	**0.0**	**3.00**	**0.25**
PG1e	**46**	**3.5**	**3.0**	**0.5**	**3.25**	**0.25**
PG1b	**46**	**3.5**	**3.5**	**0.0**	**3.50**	**0.50**
PG1c	**46**	**3.5**	**3.5**	**0.0**	**3.50**	**0.50**
PG1f	**46**	**4.5**	**4.0**	**0.5**	**4.25**	**1.00**
PG1a	**46**	**6.5**	**6.0**	**0.5**	**6.25**	**1.00**

between 6,950 and 4,950 B.P. More recently the pit-and-groove style has been found to have persisted to historic times in California (True and Baumhoff 1981).

Figure 17 Boulder Petroglyphs (Feature 68).

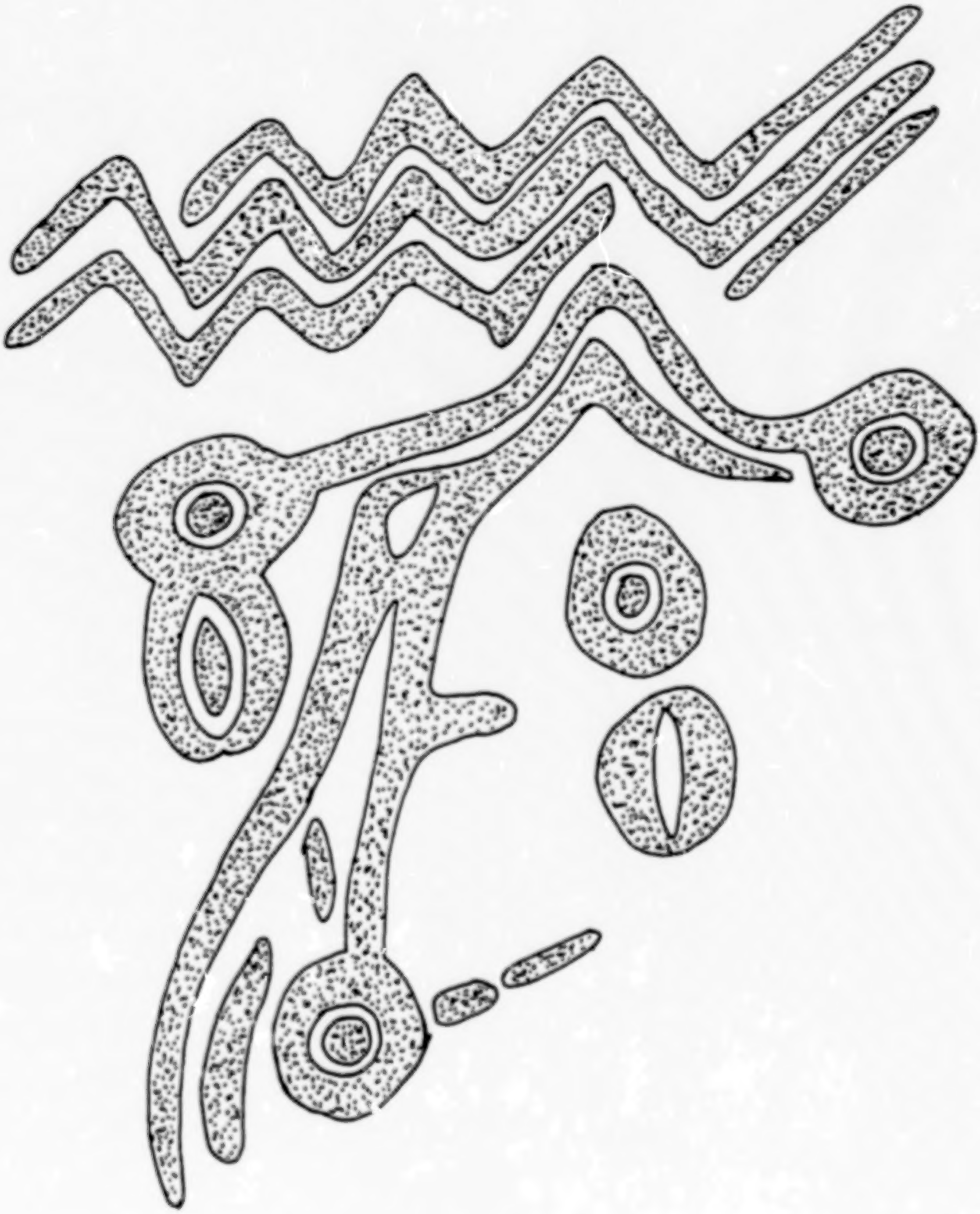

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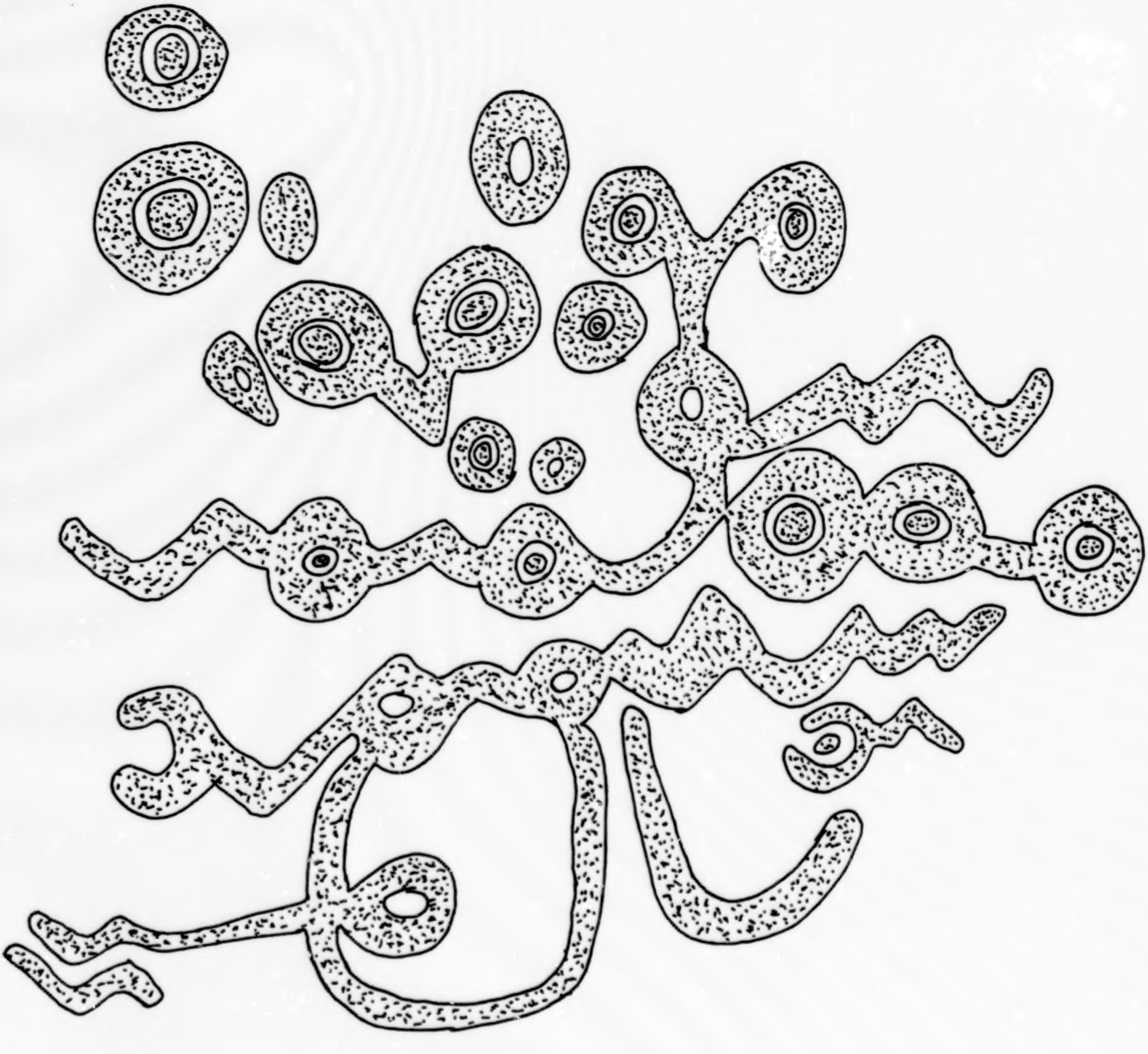
Figure 18 Rimrock Petroglyphs (Feature 69).



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7. ORGANIC REMAINS

Very little organic debris was recovered from the Peninsula Site. The greatest variety came from excavation units placed inside circular rock features. All excavation units yielded charcoal ranging from small flecks to small pieces 5-6 cm3 in size. Units placed inside circular rock features tended to yield more charcoal than those placed outside these features.

Five bone fragments, four extremely small, were recovered from the excavations. One fragment came from level 5 of unit 47S/145E. This unit was not placed inside a circular rock feature. Three bone fragments were recovered from units placed inside CRF 15. One fragment each was recovered from levels 2 and 3 of unit 195S/260E and one was recovered from level 2 of unit 197S/260E. These fragments have not been identified. The fifth and largest fragment was recovered from level 2 of unit 23.5N/1.5E, inside CRF 1. This fragment appears to have come from a large mammal.

One mussel shell, *Anodonta* sp., was recovered from a pack rat midden near CRF 15. No other shell fragments were recovered from the site.

Six berries, tentatively identified as those of *Juniperus occidentalis*, were recovered from the excavation units in CRF 15. Four of these were from level 2 of unit 195S/260E, and two were from level 2 of unit 197S/260E. In addition, a camas bulb (*Camassia quamash*) was also recovered from level 2 of unit 195S/260E in CRF 15. This bulb is not charred and is quite desiccated. Also recovered from unit 195S/260E were fragments of a wooden post. The only other floral remains recovered came from level 1 of unit 16N/38. This excavation unit was placed just outside the rectangular rock feature. Recovered were an unidentified casing of a seed or berry and a smaller unidentified seed.

As previously indicated, the remains of two wooden posts were found in CRF 15. Both post remains were found along the north wall of that feature. The post remains were collected but have not yet been identified as to species.

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8. LITHIC ARTIFACTS

The discussion here is primarily focused on the subsurface artifact collection, but also includes well-formed diagnostic tools, such as projectile points, and other artifacts belonging to tool classes not represented in the subsurface collection. Artifact counts for adjacent excavation units have at times been combined for the following discussion to provide a larger sample size for intrasite comparisons.

DEPTH OF CULTURAL DEBRIS

The principal intrasite variation in the depth from which cultural debris was recovered was determined by whether or not an excavation unit was inside or outside a rock feature. Units 23.5N/1.5 and 2.0E were placed inside CRF 1 and yielded debris only to a depth of 20 centimeters. Unit 11.5N/34.5E was placed inside the rectangular rock feature and also yielded cultural debris to a depth of 20 centimeters. Units 195S/260E and 197S/260E were placed inside CRF 15 and yielded cultural debris to a depth of 30 centimeters.

By contrast, units 47S/145E and 47S/146E were placed outside the rock features and yielded cultural debris to a depth of 60 centimeters. Units 75S/144.5E and 197.5S/271.5E both yielded cultural debris to a depth of 40 centimeters. Some of the larger circular rock features may have had cultural debris to similar or greater depths. However, the interiors of most of these features had been so seriously disturbed that undisturbed deposits did not appear to be present.

Alternately, the relative lack of depth to the cultural deposits within the rock features might be attributed to their continued use and reuse as house structures. The ethnographic record indicates that the Modoc annually dismantled and "cleaned out" their winter structures. This could slow the accumulation of cultural debris within these structures. Correspondingly, cultural deposits outside these structures would have increased depths resulting from the deposition of the debris cleaned out of the houses. All the excavation units placed outside the rock features were placed somewhat downslope from these features because it was thought that these areas may have been the location of accumulated house refuse. Consequently, another factor that might have resulted in deeper cultural deposits in these areas is their downslope position and the likelihood that some mass movement processes have been gradually transporting cultural and other debris downslope.

DEBITAGE

A total of 1,817 pieces of debitage were recovered from the Peninsula Site. Of this total, 1,597 belong to the subsurface collection. By count this includes 1,230 pieces of obsidian, 225 pieces of basalt or basalt-like, 125 pieces of cryptocrystalline silicas and 17 pieces of petrified wood. By weight the basalt debitage totals 413.83 g followed by obsidian at 337.12 g, cryptocrystalline silicas at 144.77 g and petrified wood at 28.71 g (Table 13).

When these debitage count and weight figures are converted into percentages on a site-wide basis and by excavation unit and levels, some intrasite variation can be discerned. Overall 77.02% of the subsurface debitage by count was obsidian. Within the site, the range was from a low of 49.97% at unit 197.5S/271/5E to a high of 86.94% at units 23.5N/1.5E and 23.5N/2.0E. By weight, obsidian constitutes 36.47% of the debitage with a range of 8.14% at unit 197.5S/271.5E to 68.97% at unit 11.5N/34.5E (Table 14). Macroscopically the obsidian is quite varied, ranging from translucent to opaque and from red to gray to black.

Basalt or basalt-like debitage constitutes a relatively high percentage at three excavation units. By count and weight respectively these were 33.33% and 72.45% for unit 197.5S/271.5E, 21.13% and 69.18% for unit 75.5S/144.5E, and 23.40% and 56.82% for unit 16N/38E. Overall the subsurface debitage makes up 14.09% by count and 44.77% by weight of the total subsurface debitage collection.

Cryptocrystalline silica debitage constitues 7.83% by count and 15.66% by weight for the subsurface debitage. By count, the range was from a low of 4.01% at units 47S/145E and 47S/146E to a high of 16.67% at unit 197.5S/271.5E. By weight, the range was from 6.38% at unit 197.5S/271.5E to a high of 19.72% at unit 197S/260E.

The small sample of petrified wood debitage makes it difficult to interpret. Overall only 1.07% by count and 3.11% by weight of the subsurface debitage was of petrified wood. Most of this was found in the more northerly units. No petrified wood debitage was found in units 75.5S/144.5E and 195S/260E.

The percentages of material type of debitage by count and weight for the excavation units are graphically represented in Figures 19 and 20. Extrapolated count and weight density figures also indicate some intrasite variation (Table 13). Units 23.5N/1.5E and 23.5N/2.0E have the highest count density at 2,910 flakes per cubic meter of fill. The lowest count density was found at units 47S/145E and 47S/146E at 438 flakes per cubic meter. By weight the highest density was found at unit 197.5S/271.5E with 1,464.60 g per cubic meter. This probably reflects the relatively high proportion of basalt debitage from this unit. The lowest density by weight was at unit 11.5N/34.5E at 319.00 g per cubic meter.

Primary or secondary cortex flakes totals only 46 pieces of subsurface debitage (Appendix B, Table B-1). Most of the debitage is interior flakes and flake fragments. By size most fell into either the 1 cm or 2 cm size classes. Because only 1/4 in. mesh screen was used in screening the fill it is likely that many pieces of debitage less than 1 cm in size were not recovered. The lack of cortex flakes and the relatively small size of the debitage recovered suggests that lithic manufacturing activity was mainly limited to finishing work, reworking of broken or exhausted tools and other tool maintenance. Consideration of sampling bias offers an alternative explanation. Excavation units were either placed inside or near house

Table 13 Subsurface Debitage Count and Weight by Provenience Unit and Material Type.

Unit	Depth (cm)	Obsidian		CCS		Basalt-like		Petrified Wood		All Material Types			
		Ct	Wt (g)	Ct	Wt (g)	Ct	Wt (g)	Ct	Wt (g)	Ct	Wt (g)	Ct/m³	Wt/m³
23.5N/1.5E	0-10	206	46.54	13	6.78	15	10.29	3	1.69	237	65.30	4,740	172.20
23.5N/2.0E	10-20	47	12.51	4	6.14	3	2.08	-	-	54	20.73	1,080	414.60
	Total	253	59.05	17	12.92	18	12.37	3	1.69	291	86.03	2,910	860.30
11.5N/ 34.5E	0-10	58	9.65	3	0.86	3	1.16	1	0.23	65	11.90	2600	476.00
	10-20	7	1.35	1	0.28	3	2.42	-	-	11	4.05	440	162.00
	Total	65	11.00	4	1.14	6	3.58	1	0.23	76	15.95	1520	319.00
16N/38E	0-10	28	3.91	2	1.43	10	9.80	2	1.99	42	17.13	1680	685.20
	10-20	4	0.55	-	-	1	0.57	-	-	5	1.12	200	44.80
	Total	32	4.46	2	1.43	11	10.37	2	1.99	47	18.25	940	365.00
47S/145E	0-10	58	13.08	5	19.41	9	19.13	1	0.17	73	51.79	584	414.32
47S/146E	10-20	27	7.02	2	0.66	3	7.34	1	0.16	33	15.18	264	121.44
	20-30	41	12.35	3	13.89	5	2.84	2	0.66	51	29.74	408	237.92
	30-40	30	5.52	-	-	6	14.41	1	0.18	37	20.11	296	160.88
	40-50	33	8.56	1	2.48	3	15.17	-	-	37	26.21	296	209.68
	50-60	37	6.95	-	-	4	2.06	2	1.11	43	10.12	344	80.96
	Total	226	53.48	11	36.44	30	60.96	7	2.28	274	153.15	438	245.04
75.5S/ 144.5E	0-10	53	15.79	3	4.00	12	7.62	-	-	68	27.41	2720	1096.40
	10-20	31	5.50	4	2.53	12	7.17	-	-	47	15.20	1880	608.00
	20-30	15	2.55	4	1.36	3	0.83	-	-	22	4.74	880	189.60
	30-40	2	1.36	-	-	3	58.64	-	-	5	60.00	200	2400.00
	Total	101	25.20	11	7.89	30	74.26	-	-	142	107.35	1420	1073.50
195S/ 260E	0-10	42	14.34	13	15.20	10	12.30	-	-	65	41.84	650	418.40
	10-20	125	45.04	18	9.69	35	41.74	-	-	178	96.47	1780	964.70
	20-30	35	8.72	6	3.66	6	7.91	-	-	47	20.29	470	202.90
	Total	202	68.10	37	28.55	51	61.95	-	-	290	158.60	967	528.67
197S/ 260E	0-10	136	40.24	10	9.05	16	13.79	1	2.20	163	65.30	1630	653.00
	10-20	165	53.34	10	9.05	21	19.05	1	1.23	197	82.67	1970	826.70
	20-30	19	10.33	12	28.94	20	51.40	-	-	51	90.67	510	906.70
	Total	320	103.91	32	47.06	57	84.24	2	3.43	411	238.64	1370	795.47
197.5S/ 271.5E	0-10	11	3.25	4	1.86	10	80.78	2	19.09	27	104.98	1080	4199.20
	10-20	9	4.21	4	6.56	7	21.19	-	-	20	31.96	800	1278.40
	20-30	11	4.46	2	0.46	3	2.20	-	-	16	7.12	640	284.80
	30-40	-	-	1	0.46	2	1.94	-	-	3	2.40	120	96.00
	Total	31	11.92	11	9.34	22	106.11	2	19.09	66	146.46	660	1464.60
Subsurface	Total	1230	337.12	125	144.77	225	413.83	17	28.71	1597	924.43	926	535.90
Site	Total	1396	357.92	136	153.61	266	441.49	19	29.66	1817	982.68		

Table 14 Subsurface Debitage Count and Weight Percentages.

Unit	Depth (cm)	Obsidian		CCS		Basalt-like		Petrified Wood	
		Ct (%)	Wt (%)	Ct (%)	Wt (%)	Ct (%)	Wt (%)	Ct (%)	Wt (%)
23.5N/1.5E	0-10	86.92	71.27	5.49	10.38	6.33	15.76	1.27	2.59
23.5N/2.0E	10-20	87.04	60.35	7.41	29.62	5.56	10.03	-	-
	Total	86.94	68.64	6.53	15.02	6.19	14.38	1.03	1.96
11.5N/34.5E	0-10	89.23	81.09	4.62	7.23	4.62	8.35	1.54	1.93
	10-20	63.64	33.33	9.09	6.91	27.27	59.75	-	-
	Total	85.53	68.97	5.26	7.15	7.89	22.45	1.32	1.44
16N/38E	0-10	66.67	22.93	4.76	8.35	23.81	57.21	4.76	11.62
	10-20	80.00	49.11	-	-	20.00	50.89	-	-
	Total	68.09	24.44	4.26	7.84	23.40	56.82	4.26	10.90
47S/145E	0-10	79.45	27.84	6.17	37.48	12.33	36.94	1.37	0.33
47S/146E	10-20	81.82	46.24	4.08	4.35	9.09	48.35	3.03	1.05
	20-30	80.39	41.53	3.80	46.71	9.80	9.55	3.92	2.22
	30-40	81.08	27.45	-	-	16.22	71.66	2.70	0.90
	40-50	89.19	32.66	3.33	9.46	8.11	15.17	-	-
	50-60	86.05	68.68	-	-	9.30	20.36	4.65	10.97
	Total	82.48	34.92	4.01	23.79	10.95	39.80	2.56	1.49
75.5S/144.5E	0-10	77.94	57.61	4.41	14.59	17.65	27.80	-	-
	10-20	65.96	36.18	8.51	16.65	25.53	47.17	-	-
	20-30	68.18	53.80	18.18	28.69	13.64	17.51	-	-
	30-40	40.00	2.27	-	-	60.00	97.73	-	-
	Total	71.13	23.47	7.75	7.35	21.13	69.18	-	-
195S/260E	0-10	64.62	34.27	20.00	36.33	15.38	29.40	-	-
	10-20	70.22	46.69	10.11	10.04	19.66	43.27	-	-
	20-30	74.47	42.98	12.77	18.04	12.77	38.98	-	-
	Total	69.66	42.94	12.76	18.00	17.59	39.06	-	-
197S/260E	0-10	83.44	61.62	6.14	13.89	9.81	21.12	0.61	3.37
	10-20	83.76	64.52	5.08	10.95	10.66	23.04	0.51	1.49
	20-30	37.25	11.39	23.53	31.92	39.22	56.69	-	-
	Total	77.86	43.54	7.79	19.72	13.87	35.30	0.49	1.44
197.5S/271.5E	0-10	40.74	3.10	14.81	1.77	37.04	76.95	7.41	18.18
	10-20	45.00	13.17	20.00	20.53	35.00	66.30	-	-
	20-30	68.75	62.64	12.50	6.46	18.75	30.90	-	-
	30-40	-	-	33.33	19.17	66.67	80.83	-	-
	Total	49.97	8.14	16.67	6.38	33.33	72.45	13.03	11.61
Subsurface	Total	77.02	36.47	7.83	15.66	14.09	44.77	1.07	3.11

Figure 19 Subsurface Debitage Count Percentages by Combined Provenience Units.

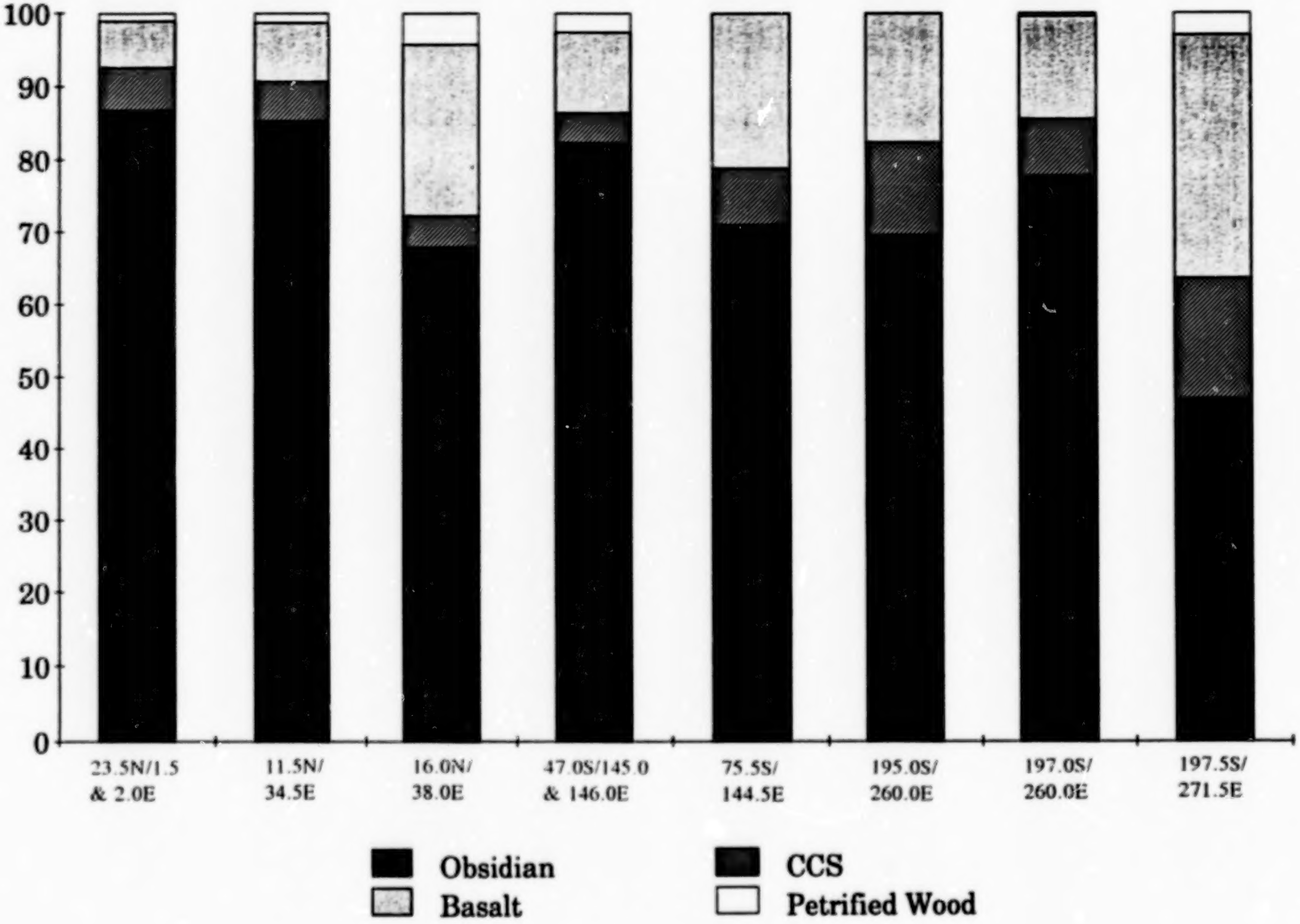

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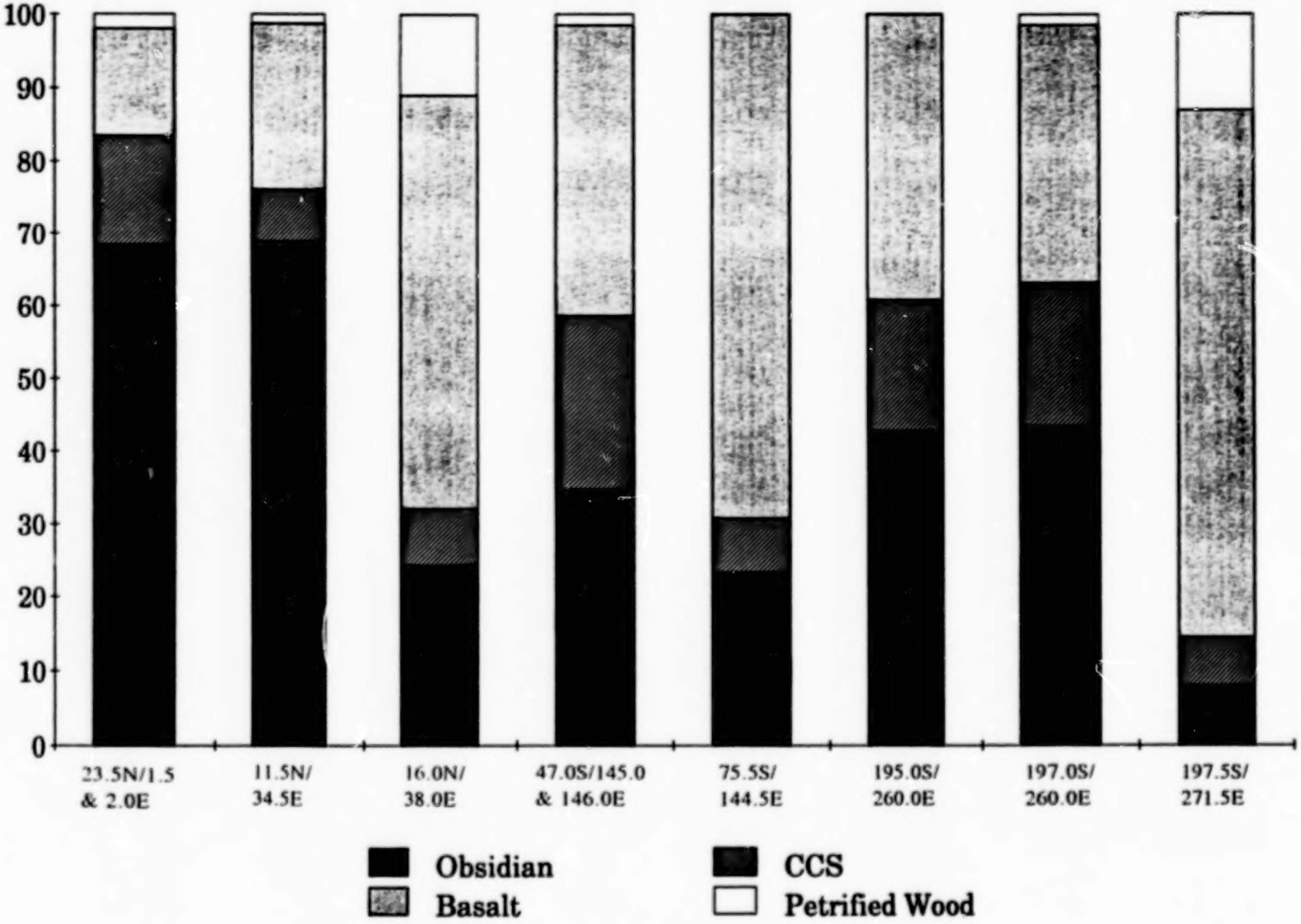
Figure 20 Subsurface Debitage Weight Percentages by Combined Provenience Units.



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structures where tool refinishing and maintenance was the primary lithic activity expected to occur. An area of lithic debris, not in association with any rock feature, was found in the southeast part of the site. Limited field time precluded test excavations in this area. This lithic debris may represent an earlier stage of the tool manufacturing process than was found elsewhere.

DEBITAGE/TOOL RATIOS

Debitage makes up 89.6% and tools 10.4% of the subsurface artifact collection from the Peninsula Site (Table 15). Overall the ratio of pieces of debitage to tool artifacts is 8.59:1. Within the site there is considerable variation, with the units excavated inside circular rock features having a lower ratio of debitage to tools than those excavated outside the rock features. The lowest ratio was 6.04:1 from unit 195S/260E in CRF 15 and the highest was 22.00:1 from unit 197.5S/271.5E downslope from CRF 15.

FLAKED TOOL INVENTORY

Of the 186 subsurface artifacts identified as tools, 45.16% either are items belonging to more than one tool type or are a single tool type with more than one used and/or worked edge (Table 16). Used flakes and flake unifaces constitute most of the tools contained in the collection. A greater proportion of individual obsidian artifacts represented more than one tool type than did basalt or cryptocrystalline silica artifacts.

The subsurface tools types include 130 flake unifaces, 83 unifacially used flakes, 39 bifacially used flakes, 21 projectile points, 13 bifaces, 10 flake bifaces, and 2 cores. Of the 186 subsurface artifacts identified as tools, 156 were obsidian, 17 basalt, 11 cryptocrystalline silica, and 2 petrified wood. Flake tool types collected from the surface include 18 unifacially used flakes, 10 bifacially used flakes, 12 flake unifaces, 9 projectile points, and 6 cores. Of the 55 surface collected tools, 33 were obsidian, 12 basalt, five cryptocrystalline silica, and 5 petrified wood.

The most obvious intrasite variation in the distribution of flaked tool types is that excavation units inside the circular rock features, 23.5N/1.5E, 23.5N/2.0E, 195S/260E and 197S/260E, yielded a greater proportion of projectile points, with the units in CRF 15 yielding somewhat more than those in CRF 1. This may be due to sampling error in that the units in CRF 1 were placed in the only undisturbed area, along the inside edge of the ring wall, while those in CRF 15 were placed closer to the ring's center. A complete listing of the flaked stone tools, both surface and subsurface, recovered from the Peninsula Site is given in Appendix B, Table B-2.

Table 15 Subsurface Debitage/Tool Ratios.

Unit	Depth (cm)	Debitage		Tool Artifacts		Debitage/Tools	Total Artifacts
		Count	Percent	Count	Percent		
23.5N/1.5E	0-10	237	87.1	35	12.9	6.77	272
23.5N/2.0E	10-20	54	100.0	0	0	-	54
	Total	291	89.3	35	10.7	8.31	326
11.5N/34.5E	0-10	65	92.9	5	7.1	13.00	70
	10-20	11	100.0	0	0	-	11
	Total	76	93.8	5	6.2	15.20	81
11.5N/34.5E	0-10	42	93.3	3	6.7	14.00	45
	10-20	5	100.0	0	0	-	5
	Total	47	94.0	3	6.0	15.67	50
47S/145E	0-10	73	90.1	8	9.9	9.13	81
47S/146E	10-20	33	100.0	0	0	-	33
	20-30	51	98.1	1	1.9	51.00	52
	30-40	37	90.2	4	9.8	9.25	41
	40-50	37	88.1	5	11.9	7.40	42
	50-60	43	91.5	4	8.5	10.75	47
	Total	274	92.6	22	7.4	12.45	296
75.5S/144.5E	0-10	68	87.2	10	12.8	6.80	78
	10-20	47	94.0	3	6.0	15.67	51
	20-30	22	100.0	0	0	-	22
	30-40	5	100.0	0	0	-	5
	Total	142	91.6	13	8.4	10.92	155
195S/260E	0-10	65	73.9	23	26.1	2.83	88
	10-20	178	89.9	20	10.1	8.90	198
	20-30	47	96.2	5	9.6	9.40	52
	Total	290	87.8	48	14.2	6.04	338
197S/260E	0-10	163	87.6	23	26.1	2.83	88
	10-20	197	86.0	32	10.1	8.90	198
	20-30	51	96.2	2	9.6	9.40	52
	Total	411	87.8	57	14.2	6.04	338
197.5S/271.5E	0-10	27	93.1	2	6.9	13.50	29
	10-20	20	100.0	0	0	-	20
	20-30	16	94.1	1	5.9	16.00	17
	30-40	3	100.0	0	0	-	3
	Total	66	95.6	3	4.3	22.00	69
Subsurface	Total	1,597	89.6	186	10.4	8.59	1,783

Table 16 Flake tool Artifact Inventory By Type and Combined Provenience Unit.

	Depth	Tool Type							Single Type		Multiple Type		
Unit	(cm)	UFUF	BFUF	FU	FB	BF	PP	CR	Count	Percent	Count	Percent	Total
Obsidian													
23.5N/1.5 23.5N/2.0E	0-10	11	16	21	0	1	5	0	15	44.12	19	55.88	34
11.5N/34.5E	0-10	0	0	2	1	1	1	0	5	100.0	0	0	5
16N/38E	0-10	1	0	1	0	0	1	0	2	66.67	1	33.33	3
47S/145E	0-10	3	2	3	1	0	0	1	3	50.00	3	50.00	6
47S/146E	20-30	0	0	0	0	0	1	0	1	100.00	0	0	1
	30-40	0	1	0	0	1	0	0	2	100.00	0	0	2
	40-50	1	0	6	0	0	0	0	0	0	3	100.00	3
	50-60	2	1	4	0	0	0	0	0	0	3	100.00	3
	0-10	4	3	7	1	1	0	0	4	50.00	4	50.00	8
75.5S/144.5E	10-20	0	0	3	0	0	0	0	1	33.33	2	66.67	3
	0-10	10	3	9	1	1	0	0	12	66.67	6	33.33	18
195S/260E	10-20	2	4	16	1	1	3	0	9	56.25	7	43.75	16
	20-30	5	0	4	0	0	1	0	1	20.00	4	80.00	5
	0-10	12	1	16	4	2	2	0	9	45.00	11	55.00	20
197S/260E	10-20	5	3	21	1	3	7	1	18	72.00	7	28.00	25
	20-30	0	0	2	0	0	0	0	0	0	1	100.00	1
	0-10	3	0	3	0	0	0	0	0	0	2	100.00	2
197.5S/271.5E	20-30	0	0	0	0	1	0	0	1	100.00	0	0	1
	Total	58	34	118	9	12	21	2	83	53.21	7	46.79	156
Subsurface Obsidian													
	Total	8	5	5	0	11	8	3	3				
Surface Obsidian													
Crptocrystalline silica (CCS)													
47S/145E	10-20	0	1	0	0	0	0	0	1	100.00	0	0	1
75.5S/144.5E	0-10	0	0	2	0	0	0	0	0	0	1	100.00	1
195S/260E	0-10	2	0	2	0	0	0	0	2	66.67	1	33.33	3
	10-20	0	0	2	0	0	0	0	2	100.00	0	0	2
197S/260E	10-20	1	0	2	1	0	0	0	1	50.00	1	50.00	2
	20-30	1	0	0	0	0	0	0	1	50.00	1	50.00	2
Subsurface CCS	Total	4	0	8	1	0	0	0	7	63.64	4	36.36	11
Surface CCS	Total	5	0	0	0	1	0	0					

Table 16 Flake Tool Artifact Inventory by Type and Combined Provenience Unit (continued).

	Depth	Tool Type							Single Type		Multiple Type		
Unit	(cm)	UFUF	BFUF	FU	FB	BF	PP	CR	Count	Percent	Count	Percent	Total
Basalt													
23.5N/1.5E 23.5N/2.0E	0-10	0	0	0	0	1	0	0	1	100.00	0	0	1
47S/145E	0-10	6	1	0	0	0	0	0	0	0	3	100.00	3
	30-40	1	0	0	0	0	0	0	1	100.00	0	0	1
	40-50	3	0	0	0	0	0	0	1	50.00	1	50.00	2
75.5S/144.5E	0-10	0	0	1	0	0	0	0	1	100.00	0	0	1
195S/260E	0-10	0	1	1	0	0	0	0	2	100.00	0	0	2
	10-20	1	0	0	0	0	0	0	1	100.00	0	0	1
197S/260E	0-10	3	0	2	0	0	0	0	2	66.67	1	33.33	3
	10-20	4	1	0	0	0	0	0	2	66.67	1	33.33	3
Subsurface Basalt	Total	18	3	4	0	1	0	0	11	64.71	6	35.29	17
Surface Basalt	Total	3	4	3	0	0	0	0					
Petrified Wood													
195S/260E	10-20	1	0	0	0	0	0	0	1	100.00	0	0	1
197S/260E	0-10	1	1	0	0	0	0	0	0	0	1	100.00	1
Subsurface PW	Total	2	1	0	0	0	0	0	1	50.00	1	50.00	2
Surface PW	Total	2	1	4	0	0	0	0					
Subsurface Total		83	39	130	10	13	21	2	102	54.84	84	45.16	186
Surface Total		18	10	12	0	12	8	8					

Used Flakes, Flake Unifaces, and Flake Bifaces

Used flakes are flakes, small chunks, or tool fragments that exhibit use on one or two sides of an edge, fracture face, or ridge. Unifacially used flakes exhibit use wear on only one side; bifacially used flakes exhibit use on two sides. Flake unifaces are flakes or small chunks which have been unifacially retouched on one or more edges; flake bifaces have been bifacially retouched.

One of the most striking characteristics of the artifacts recovered from the Peninsula Site is the predominance of small flake tools, often with multiple used and/or worked edges. Apparently absent are more finely finished tool forms. It is as if the available lithic material were used and reused, worked and reworked, until individual pieces became so small they were discarded.

In classifying the flake tools, the distinction between used and worked edges described by Pettigrew (1985:101) was employed:

> worked edges show regularly spaced flake scars that are of generally equivalent size; used edges show a more erratic pattern in which the spalls or scars are irregularly spaced and of different sizes.

Even with this distinction, classification was difficult. As analysis progressed similarities between used and worked edges in edge type and wear became apparent. Therefore, for analytical purposes, the used and worked flakes were considered together.

Analysis of the subsurface obsidian used and worked flakes shows that concave and notched edges are the most frequent type (Figure 21a-c, e, h-j, l, m, o, p). Next most frequent are straight edge types (Figure 21j, l, m, o) and then convex edge types (Figure 21e, j-l, o, p). The edge types can be grouped into categories as shown in Table 17. For unifacially used and worked straight or convex edges, the edge angles tend to be greater than 60 degrees. For bifacially used and worked straight edges they tend to be less than 60 degrees. No pattern is clear for bifacially used and worked convex edges. For concave and notched edges of unifacial and bifacial types, the angles are mostly between 60 and 74 degrees.

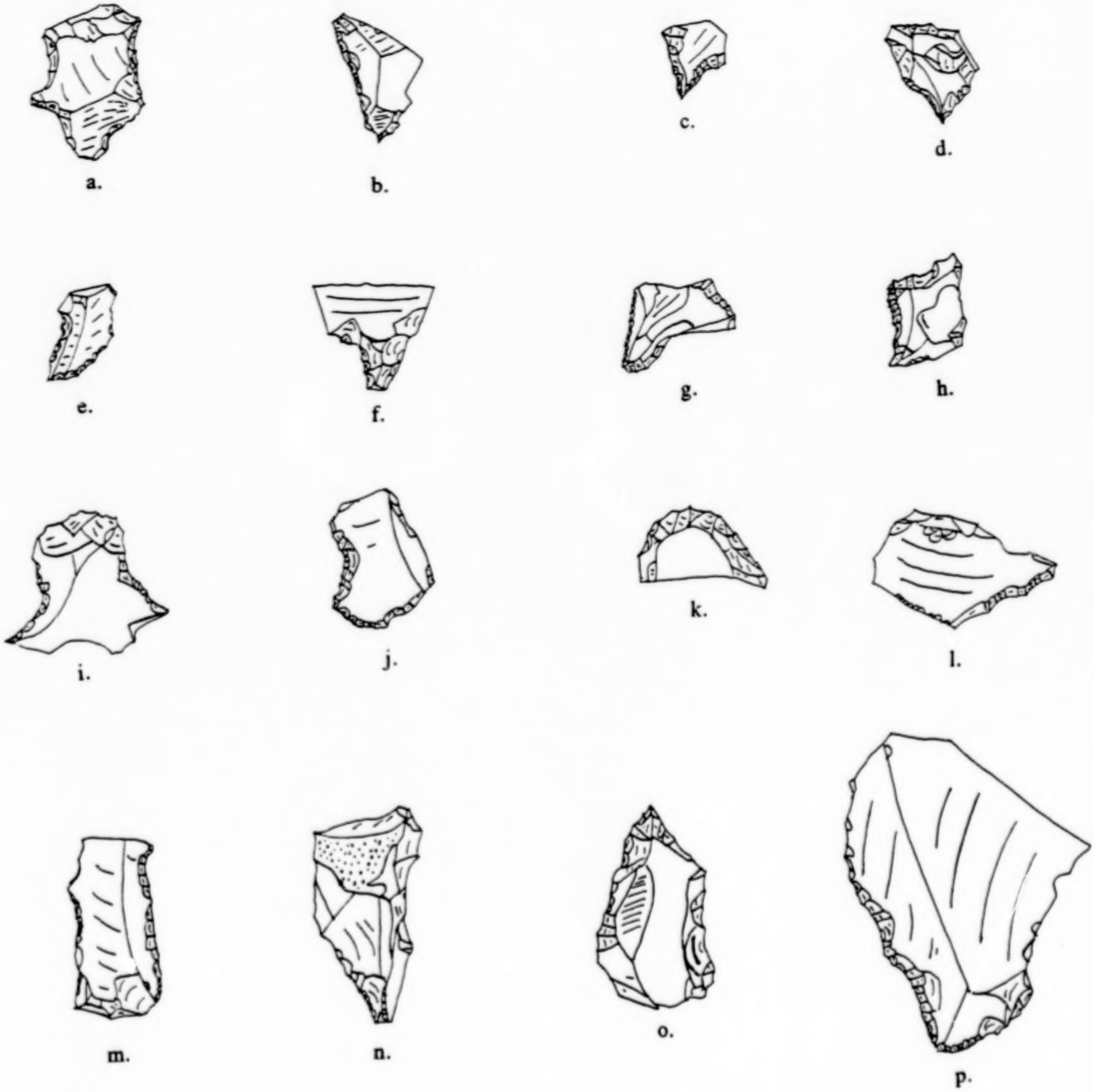
Table 17 Edge Shape and Edge Angle of Subsurface Used and Worked Flaked Tools.

Edge Tool	Straight UFUF & FU			Straight BFUF & FB			Convex UFUF & FU			Concave Notched UFUF, BFUF, FU & FB		
Angle:	<60	60-74	>74	<60	60-74	>74	<60	60-74	>74	<60	60-74	>74
23.5N/1.5E 23.5N/2.0E	1	3	4	4	0	3	1	3	6	3	6	5
195/260E 197S/260E	2	15	13	4	1	0	2	15	13	6	28	13
Other units	1	3	5	2	1	0	1	3	5	4	11	9
Total	4	21	22	10	2	3	4	21	22	13	45	27

Note: Concave and notched category includes single and double concave and single and double notched.

The relatively steep angles of the unifacially used and worked straight and convex edges suggests use on hard surfaces. The relative lack of bifacially used and worked straight and convex edges on obsidian suggests that cutting or slicing occurred less than scraping on this material. The relatively large number of concave and notched edges is suggestive of the working of objects with a curved surface, such as bone or wood.

Figure 21 Used and Flaked Obsidian Tools.



a. 626-87-9-1-12
b. 626-87-1-1-14
c. 626-87-8-2-9
d. 626-87-2-1-21
e. 626-87-1-1-11
f. 626-87-8-1-13
g. 626-87-8-1-4
h. 626-87-7-1-8
i. 626-87-5-5-1
j. 626-87-1-1-13
k. 626-87-4-1-3
l. 626-87-9-2-21
m. 626-87-8-2-8
n. 626-87-7-1-6
o. 626-87-1-1-3
p. 626-87-9-2-22

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A number of the unifacially or bifacially worked flakes have points or projections. These points or projections have been flaked on one of two intersecting edges, on two intersecting edges, or on alternate sides of two intersecting edges. The point or projection takes a number of forms. Short forms include contracting and sharp (Figure 21c, d, h, m), and broad and rounded projections (Figure 21a, h). Elongate forms are parallel-sided (Figure 21f); contracting and sharp (Figure 21i, k); contracting and rounded (Figure 21b, g); broad, contracting, and sharp (Figure 21j, o); and, contracting and squared (Figure 21n). These tools could have been used as gravers and simple drills. Most are of obsidian although a basalt and three cryptocrystalline examples (Figure 22d, g, i) are represented in the subsurface collection. One petrified wood specimen was collected from the surface.

Most of the cryptocrystalline silica tools tend to have relatively steep working edges (Figure 22). No cryptocrystalline silica tools were recovered from units 23.5N/1.5E and 23.5N/2.0E in CRF 1. On the other hand, a number of tools from units 195S/260E and 197S/260E in CRF 15 were of cryptocrystalline silica, including used flakes (Figure 22c), straight-edged flake unifaces (Figure 22e, f, i), a convex edged flake uniface (Figure 22j), a concave-edged flake uniface (Figure 22i), and flake unifaces with projections or points (Figure 22g, i).

The used and worked basalt flakes tend to be larger than those of obsidian and to a lesser degree those of cryptocrystalline silica (Figure 23). Indeed, the largest of the used and/or worked flakes was of basalt. Only two subsurface obsidian specimens fell into a size class of 5 cm or greater. This contrasts to 9 of the 19 subsurface basalt tool artifacts. It is also interesting to note that of the 35 used and/or worked flaked basalt tool types, 17 show edges with rounded or polished use wear.

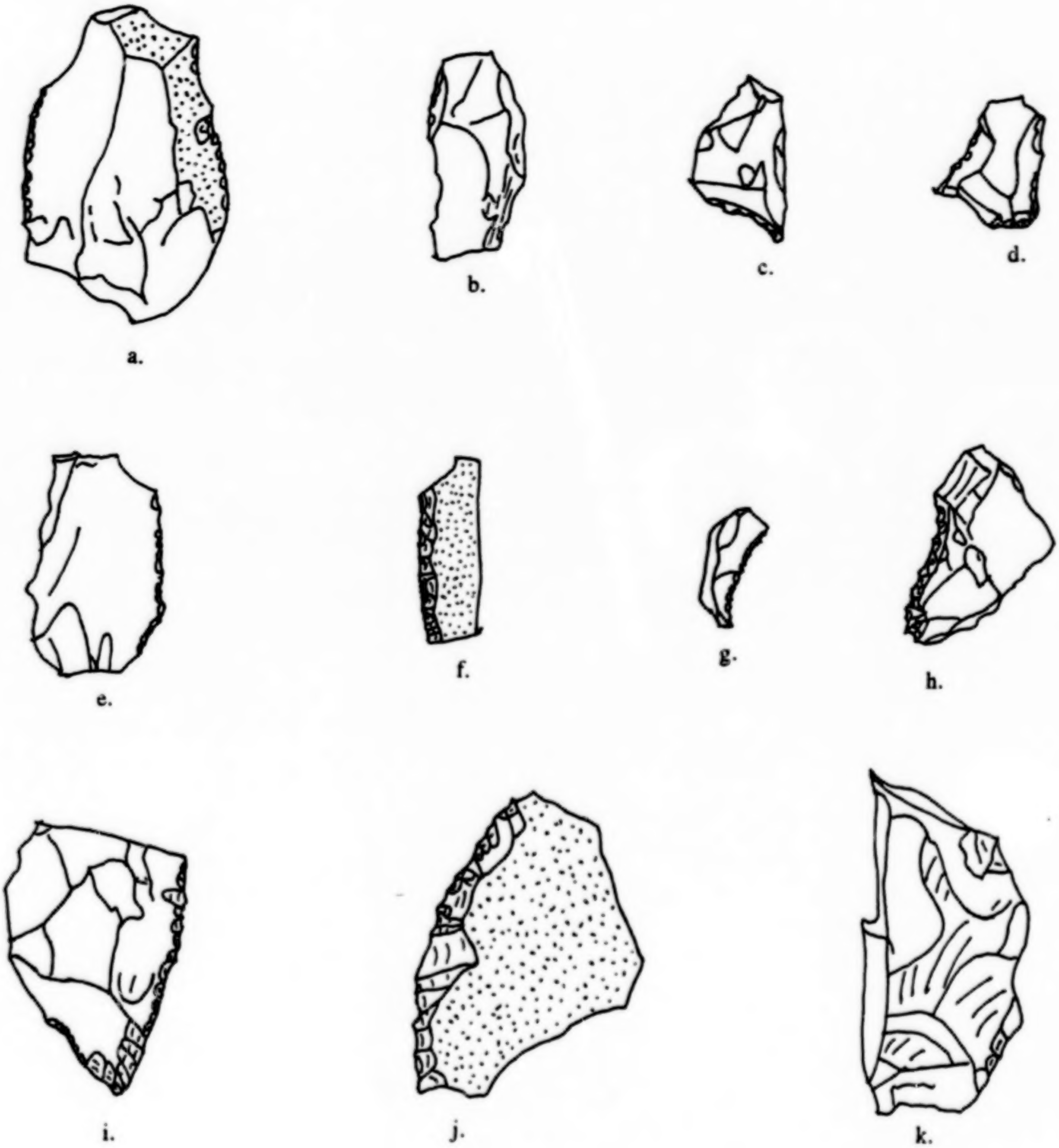
Overall the used and/or worked flaked tools are striking in their diversity, the frequency of multiple used and/or worked edges on a single artifact, and the relatively small size of the obsidian specimens. An impressionistic view of these artifacts is that they were simple household tools that may have been used in food processing and preparation, hide preparation and clothing manufacture, and the processing of plant materials for basketry and other purposes.

Bifaces

Twenty five obsidian tool artifacts were classed as bifaces other than projectile points. These are tools that have been worked on both faces such that most of the parent-flake characteristics have been obscured. These bifaces range from relatively unformed specimens (Figure 24i, j) to more finely finished forms (Figure 24f-h, l). One of them appears to be a drill with a broken bit (Figure 24l). As discussed previously, some of the worked flakes with projections or points could possibly have been used in a drill-like manner.

A number of the obsidian bifaces appear to be base or tip fragments (Figure 24b, c, e-h) or midsection fragments (Figure 24d). Two appear to be forms intermediate in the manufacture of a projectile point (Figure 24a, b). Also included in the collection, but not illustrated, are

Figure 22 Cryptocrystalline Silica Tools.



a. 626-87-S-17
b. 626-87-6-4-2
c. 626-87-9-2-17
d. 626-87-S-5
e. 626-87-8-2-13
f. 626-87-8-2-23
g. 626-87-8-1-20
h. 626-87-7-1-1
i. 626-87-9-2-24
j. 626-87-8-1-1
k. 626-87-S-51

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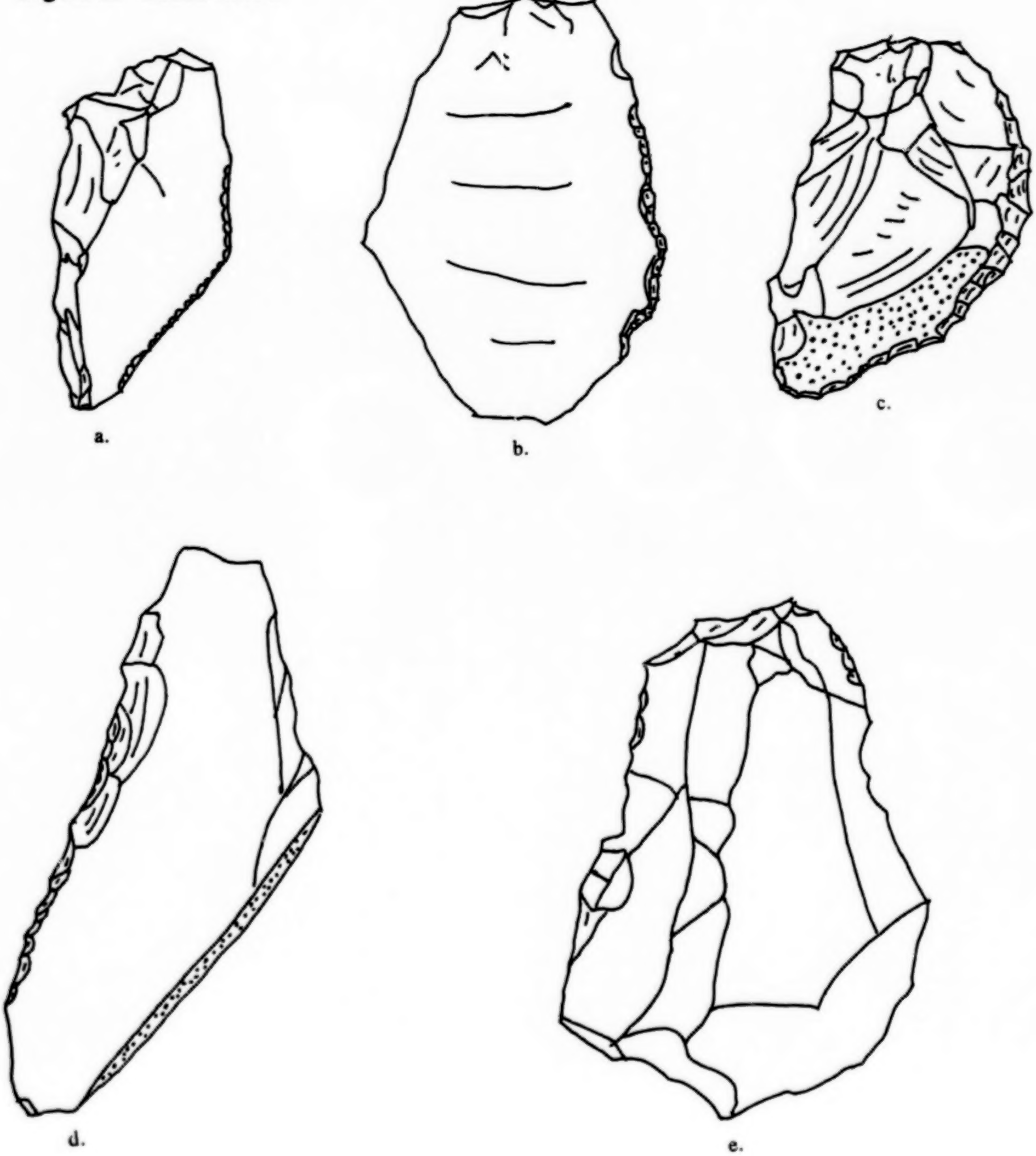
Figure 23 Basalt Tools.



a. 626-87-5-5-4 b. 626-87-S-68 c. 626-87-S-26 d. 626-87-S-49
e. 626-87-1-1-1

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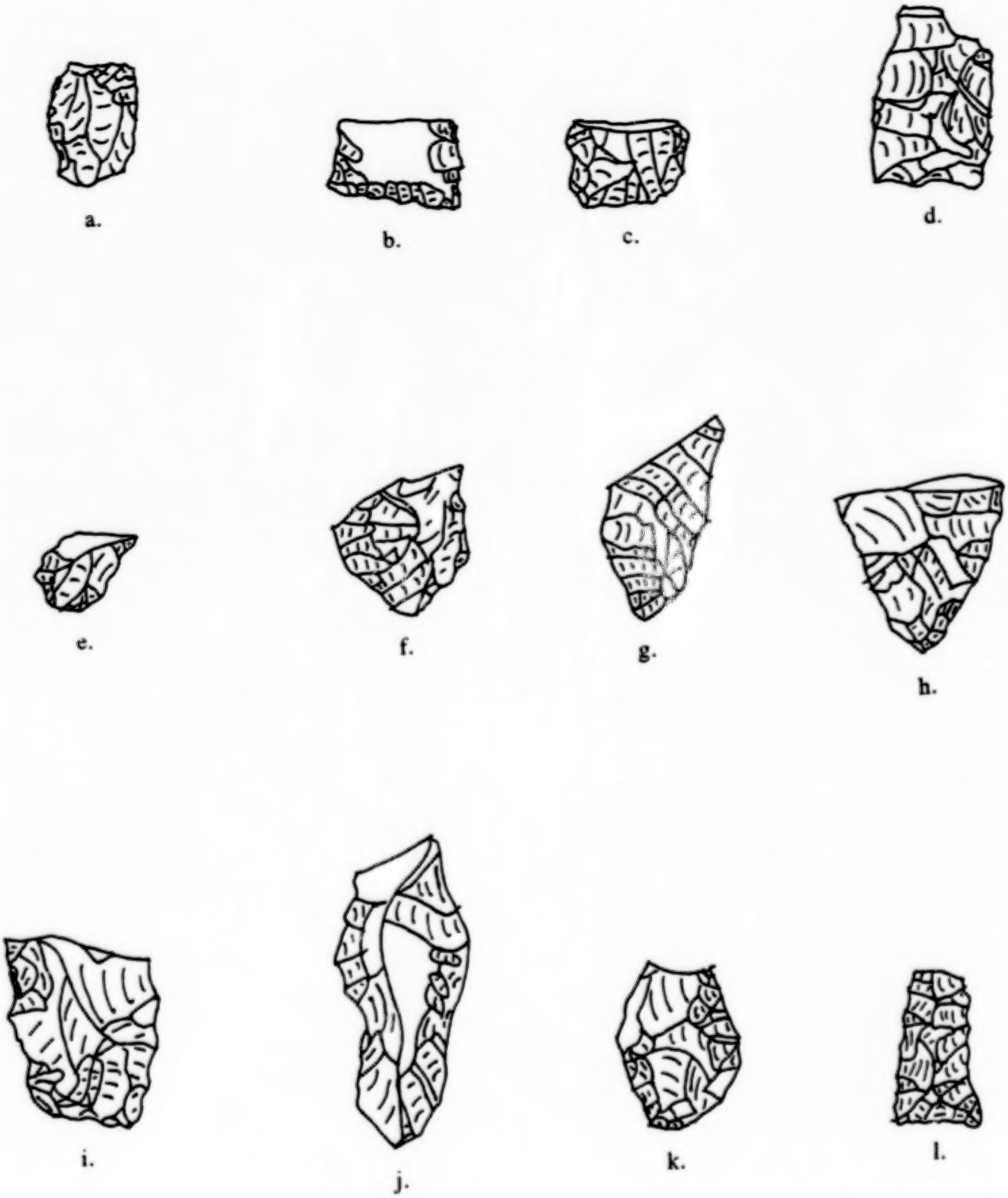
Figure 24 Obsidian Bifaces.



a. 626-87-9-2-31
b. 626-87-S-36
c. 626-87-S-78
d. 626-87-9-2-16
e. 626-87-3-1-3
f. 626-87-S-11
g. 626-87-10-3-1
h. 626-87-S-43
i. 626-87-S-40
j. 626-87-S-34
k. 626-87-8-1-16
l. 626-87-9-2-4

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lateral edge and midsection fragments (Appendix B, Table B-2). One of the bifaces, a relatively unformed specimen, is of cryptocrystalline silica (Figure 22k). A basalt specimen, somewhat more fully formed, was collected from unit 23.5N/1.5E in CRF 1 (Figure 23e).

Projectile Points

Twenty nine whole or fragmentary projectile points were recovered from the Peninsula Site (Table 18, Figure 25). Eight of these were collected from the surface and 21 were recovered from the excavation units. All except one are of obsidian.

Two projectile points are too fragmentary to classify according to type. The others, including many incomplete specimens, were typed using the taxonomic scheme developed by Thomas (Thomas and Bettinger 1976). This scheme was supplemented by reference to Pettigrew (1985:102-105) and Sampson (1985).

Three points were assigned to the Desert Side-Notched type (Figure 25a-c). These are narrow-necked with neck widths ranging from 7.4 to 9.1 millimeters. Two were recovered from unit 197S/260E in CRF 15 and one was collected from the surface. Based on a review of literature, Pettigrew (1985:104) assigns this type to between A.D. 1200 (750 B.P.) and historic times.

Two points were assigned to the Cottonwood Triangular type (Figure 25d-e). These are unstemmed, triangular points with a straight base. Again, both were recovered from unit 197S/260E in CRF 15. Pettigrew (1985:104) assigns this type to between from A.D. 900 (1,050 B.P.) and historic times.

Five points were assigned to the Rosegate series (Figure 25f-h). Two of these are too fragmentary to assign to a particular type within this series. One came from unit 197S/260E in CRF 15 and the other was collected from the surface. Two specimens were assigned to the Rosegate Type A defined by Pettigrew (1985:104) as "stemmed, not notched, narrow-necked, barbed, with a non-diverging stem." One of these was recovered from unit 197S/260E in CRF 15 and one was collected from the surface. One specimen was assigned to the Rosegate Type C defined by Pettigrew (1985:104) as "stemmed, not side-notched, narrow-necked, with a diverging stem." This point was recovered from unit 195S/260E in CRF 15. Pettigrew (1985:104) suggests a "reasonable assignment" of these Rosegate types to between A.D. 1 (1,950 B.P.) and historic contact.

One point was assigned to the Gunther Barbed type (Figure 25i). It resembles the subtype described by Sampson (1985:342) as a "small, broad point with convex blades, parallel stem, shoulder slightly drooping or square and a width/length ratio of 0.6 or higher." This point was recovered from unit 197S/260E in CRF 15. Sampson (1985:342-347) found Gunther Barbed type points in Nightfire Island deposits dating from 600 B.C. to A.D. 1400 (2,550 to 550 B.P.). He found the small, broad subtype to appear primarily in deposits predating A.D. 500 (1,450 B.P.).

Table 18 Projectile Points.

Artifact Number 626-87-n	Type	Neck Width	Basal Width	Length	Width	Thick-ness	Weight	Fragment type	Comments
2-1-1	GCSS	11.2	13.3*	35.3*	17.1*	4.7	2.08*	T, 1/2Sb	
2-1-2	HCBB	9.1	11.2*	7.1*	11.2*	2.4	0.24*	FA	
2-1-3	-	--	-	11.6*	9.3*	3.0	0.38*	FM	Triangular fragment
2-1-4	-	-	-	0.9*	0.6*	0.4	0.15*	FM	
2-1-5	-	-	-	0.8*	1.0	0.3*	0.23*	FM	Triangular fragment
3-1-1	WL	-	-	17.7*	9.2	5.1	0.70*	FM	Heavily serrated
4-1-1	-	-	-	2.9*	0.9*	0.6*	0.20*	FM	
6-3-1	WL	-	-	14.3*	10.4	5.3	0.76*	FA	
8-2-1	-	-	-	11.0*	8.9*	3.7	0.32*	FM	
8-2-15	RGC	4.8	5.8	17.3*	11.0*	2.5	0.37*	T, B	
8-2-17	-	-	-	15.9*	13.4*	3.0	0.60*	FM	
8-3-1	-	-	-	14.3*	12.7*	2.8	0.44*	FT	Triangular fragment
9-1-9	DSN	7.4	-	6.7*	11.6*	2.3	0.33*	T, B	
9-1-10	-	-	-	11.4*	9.3	2.2*	0.22*	FM	Triangular fragment
9-2-1	CT	-	-	13.1*	11.7	3.0	0.42*	FA	
9-2-5	GB	4.3	-	11.7*	11.3*	2.9	0.34*	T, S, B	
9-2-11	CT	-	18.0	24.0*	18.0	2.7	0.94*	T	
9-2-13	DSN	8.1	13.2	18.7	13.2	2.9	0.54	C	
9-2-26	RGA	3.8	3.5	18.2*	10.7	3.1	0.54*	T, B	
9-2-27	RG?	-	-	8.5*	8.2*	2.8	0.20*	FM	
9-2-28	-	-	-	9.2*	8.9*	2.2	0.17*	FM	Triangular fragment
16-S-6	-	-	-	10.5*	9.0*	4.5*	0.33*	FB	
S-9	BRCB	-	19.5*	13.8*	19.5*	5.0	1.76*	FA	3.8N/40.7E
S-10	DSN	7.9	-	15.4*	12.1*	2.2	0.33*	T, L, B	8.0N/50.1E
S-27	RG?	3.2	-	10.0*	8.2*	2.3	0.15*	T, S, B	305.4S/302.7E
S-41	ECN?	7.1	12.8	15.2*	12.8	3.4*	0.51*	T, L, B	315.1S/269.2E
S-42	RGA	4.4	4.1	15.2*	12.1*	2.2	0.41*	T, B	318.6S/345.7E
MKM-1	HCBB	-	11.5	18.6*	11.5	4.6	0.93*	T	Provenience unknown
JB-1	WL	-	-	50.4	13.8	8.6	5.33	C	At reservoir below CRF 15

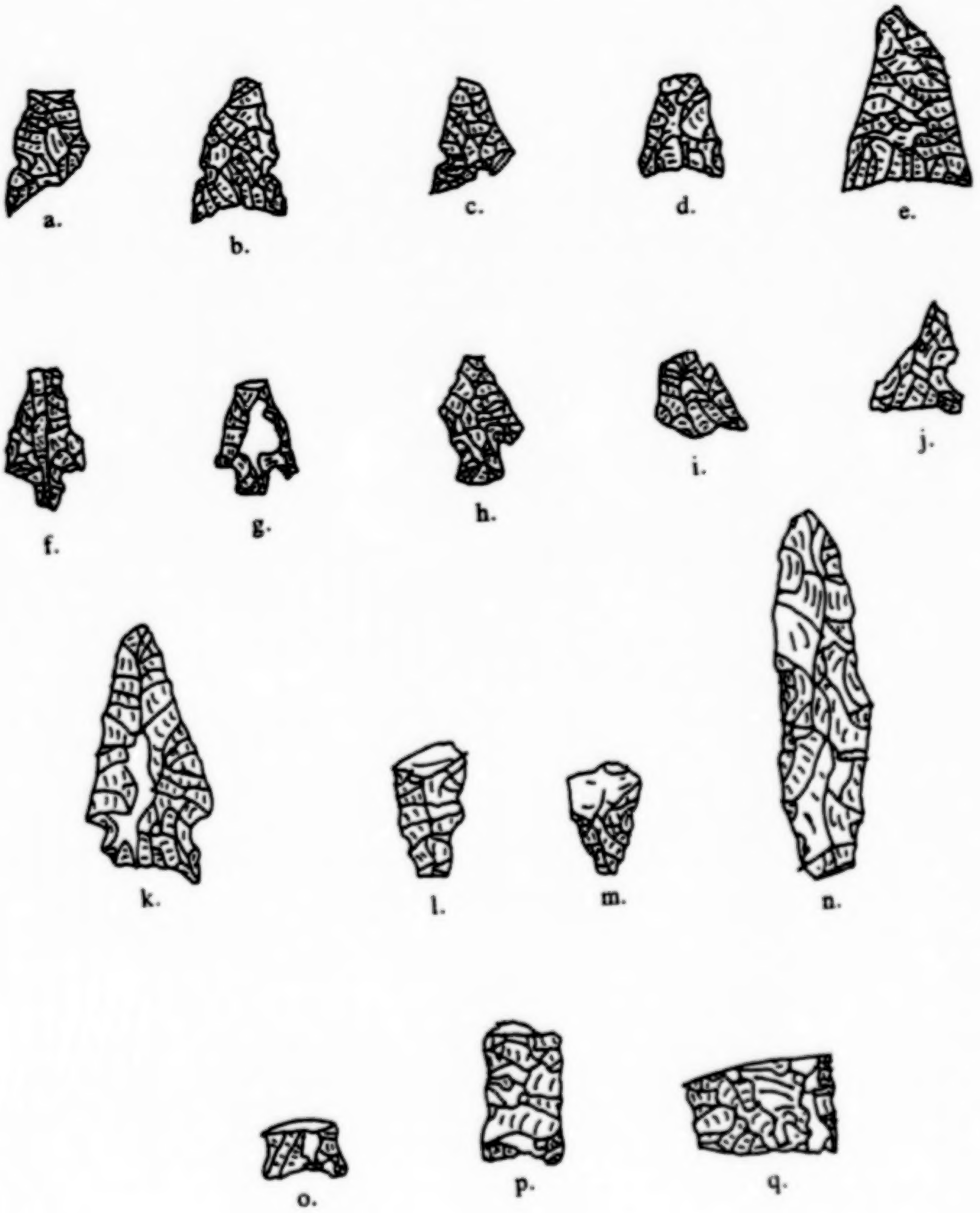
* = Fragmentary measurement Measurements in millimeters, weight in grams

All points are obsidian except 626-87-JB-1, which is cryptocrystalline silica

DSN = Desert Side-Notched
RG = Rosegate series, untyped
RGA = Rosegate Type A (non-diverging stem)
RGC = Rosegate Type C (diverging stem)
GB = Gunther Barbed
ECN = Elko Corner-Notched
GCSS = Gatecliff Split Stem
CT = Cottonwood Triangular
HCBB = Humboldt Concave Base Type B
BRCB = Black Rock Concave Base
WL = Willow Leaf

C = Complete point
T = Tip missing
S = Stem missing
Sb = Stem base missing
B = Barb or corner missing
L = Side (lateral) missing
FT = Tip only
FA = Base only
FB = Barb or corner only
FM = Midsection fragment
? = Questionable identification

Figure 25 Projectile points recovered from the Peninsula Site, 35KL87.



a. 626-87-9-1-9
b. 626-87-9-2-13
c. 626-87-9-2-17
d. 626-87-9-2-1
e. 626-87-9-2-11
f. 626-87-9-2-26
g. 626-87-S42
h. 626-87-8-1-20
i. 626-87-9-2-5
j. 626-87-S-41
k. 626-87-2-1-1
l. 626-87-3-1-1
m. 626-87-S-51
n. 626-87-JB-1
o. 626-87-2-1-2
p. 626-87-MKM-1
q. 626-87-6-3-1

DSN: a,b,c CT: d,e RGA: f,g RGC: h GB: i ECB: j GCSS: k WL: l,m,n HCBB: o,p BRCB:q

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One point, a surface collected specimen, was tentatively assigned to the Elko Corner-Notched type (Figure 25j). This a broad-necked, corner-notched fragment with most of one side missing. Pettigrew (1985:104-105) assigns a time span of from 1300 B.C. to A.D. 700 (3,300 to 1,300 B.P.) to this type with a possible range from 2,000 B.C. to A.D. 1000 (4,000 to 1,000 B.P.).

One point was assigned to the Gatecliff Split Stem type (Figure 25k). This was a broad-necked, stemmed, notched point recovered from unit 23.5N/2.0E in CRF 1. Pettigrew (1985:105) assigns an estimated temporal range of from 3,000 to 500 B.C. (5,000 to 2,500 B.P.) to this point type.

Three points are assigned to the willow leaf type (Figure 25l-n). These are unstemmed lanceolates with a convex base. One of them, a surface collected specimen, is of cryptocrystalline silica. The other two were recovered from subsurface deposits, one from unit 11.5N/34.5E in the rectangular rock feature. and one from unit 47S/146E. Pettigrew (1985:105) was not able to assign this type to a temporal range for the Lake Abert collection although possible "analogues" were dated between A.D. 900 (1,050 B.P.) and historic times and about 6,500 B.C. (8,450 B.P.).

Two points were assigned to the Humboldt Concave Base type B (Figure 25o-p). Both are unstemmed lanceolates with concave bases and narrow basal sections. One was recovered from unit 13.5N/2.0E in CRF 1. The other point was collected from the surface. Pettigrew (1985:105) assigns a temporal range of 4,000 to 1,000 B.C. (6,000 to 3,000 B.P.) to this type although he states that "the age of the style is still somewhat controversial."

One point was assigned to the Black Rock Concave Base type (Figure 25q). This is an unstemmed lanceolate with a concave base and broad basal section. This specimen was collected from the surface. Pettigrew (1985:105) assigns a temporal range from 9,000 to 5,000 B.C. (11,000 to 7,000 B.P.) to this type.

Projectile points recovered from excavation units in CRF 1 tend to be older types than those recovered from excavation units in CRF 15 and nearby CRF 21 (See Appendix F for a report of 1987 excavations in CRF 21). This is only a tentative observation in that only two of the points from CRF 1 were complete enough to be typed. In addition, surface collected points from the northwest part of the site tended to be older types than those from the southeast part of the site (Table 19).

In general the projectile points recovered from the northwest portion of the site tend to be thicker than those recovered from the southeast portion of the site. When typed points plus midsection fragments of sufficient size to measure thickness are combined, the mean thickness of subsurface points and midsection fragments for the northwest portion of the site is 4.10 mm, compared to 2.83 mm for the southeast portion of the site. When surface collected points are included, the northwest portion shows a mean of 3.96 mm and the southeast portion a mean of 2.74 mm (Table 20). Wilcoxon's sum of ranks test shows these

Table 19 Distribution of Projectile Point Types.

	Northwest Site Area			Southwest Site Area		
Type and temporal range[1]	Surface	CRF 1 Subsurface	Other Subsurface	Surface	CRF 15 Subsurface	CRF 21 Subsurface
Desert Side-notched A.D. 1200–1850	1	-	-	-	2	2
Cottonwood Triangular A.D. 900–1850	-	-	-	-	2	-
Rosegate A.D. 1–1850	-	-	-	2	3	2
Gunther Barbed 600 B.C.–A.D. 1850	-	-	-	-	1	9
Elko Corner-notched 2000 B.C.–A.D. 1000	-	-	-	1	-	-
Gatecliff Split Stem 3000–500 B.C.	-	1	-	-	-	-
Humboldt Concave Base type B 4000–1000 B.C.	-	1	-	-	-	-
Willow Leaf 6500 B.C.–A.D. 1850	-	-	1	1	-	-
Black Rock Concave Base 9000–5000 B.C.	-	-	-	-	-	-

[1] All dates from Pettigrew (1985) except for Gunther Barbed type, which is from Sampson (1985)

[2] For information on 1987 excavations in CRF 21 see Appendix F.

Table 20 Analysis of Thicknesses of Projectile Points.

Points	Northwest Area	Southeast Area	Total Site
Subsurface			
Number of specimens	5	12	17
Minimum	2.40 mm	2.20 mm	2.20 mm
Maximum	5.30 mm	3.70 mm	5.30 mm
Range	2.90 mm	1.5 mm	3.10 mm
Mean	4.10 mm	2.83 mm	3.20 mm
All points			
Number of specimens	7	14	21
Minimum	2.40 mm	2.20 mm	2.20 mm
Maximum	5.30 mm	3.70 mm	5.30 mm
Range	2.90 mm	1.50 mm	3.10 mm
Mean	3.96 mm	2.74 mm	3.15 mm

differences are significant at a probability of .10. To the extent that projectile point robustness is an indicator of age, these results reinforce the temporal indications of the typed projectile points that those in the northwest portion of the site are older than those in the southeast portion. In addition, while the results are not particularly strong, they are in line with the previously described significant differences in mean diameters of the circular rock features between the northwest and southeast portions of the site.

Cores

Five obsidian cores or core fragments were recovered from the Peninsula Site. All seem to be from small pebble cores and fall into the less-than-3-cm size class. Five basalt cores, all surface specimens, were recovered (Table 21). Two are discoidal or clam-shaped and may be preforms for bifacially formed hammer-pecking-abrading-rubbing stones (below). The smaller of these is particularly well formed (Figure 26). The other three specimens are wedge-shaped and may be preforms for manos (Figure 27).

Table 21 Recorded Data for Basalt Cores.

Artifact 626-87-n	S-8	S-38	S-61	S-62	S-37
Provenience[1]	38N/24E	73S/137E	(87S/137E)[2] In CRF 10	(87S/137E)[2] In CRF 10	90S/148E
Length (mm)	55.5	92.2	89.4	112.8	86.2
Width (mm)	33.8	69.1	67.3	83.1	61.2
Thickness (mm)	34.5	61.4	71.7	71.0	27.7
W/L Ratio	0.97	0.75	0.75	0.73	0.71
T/L Ratio	0.62	0.67	0.80	0.63	0.32
Weight (g)	106.0	490.0	565.0	691.0	185.0
Shape	disc/clam	wedge	wedge	wedge	disc/clam

[1] Provenience data rounded to nearest whole meter designation.

[2] Data in parentheses indicate center location of CRF.

BASALT AND BASALT-LIKE COBBLE OR COBBLE-FLAKE TOOLS

Basalt and basalt-like (non-glassy igneous) cobble or cobble flake tools include types often identified elsewhere as cobble choppers or grinding tools. Except for two subsurface specimens, all these tools are either surface-collected artifacts or surface features.

Pestles

Pestles are natural or modified elongate, rounded cobbles with at least one end worn to a somewhat smoothed texture. The used end has round transverse and longitudinal cross sections. Use wear is apparently the result of percussion and grinding. Two pestles were collected (Table 22). One is an end fragment. The other is small, about 10 cm long, and weighs only 146 grams (Figure 28).

Mauls

Mauls are similar in shape to pestles. However, mauls exhibit percussive use wear spread over a broader surface, probably the result of heavy, relatively uncontrolled percussion. Three mauls were collected (Table 22). All are fragmentary although one specimen, 626-87-S-28, is nearly complete (Figure 29). This artifact is a little more than 19 cm long

Figure 26 Basalt Core Specimen 626-87-S-62.

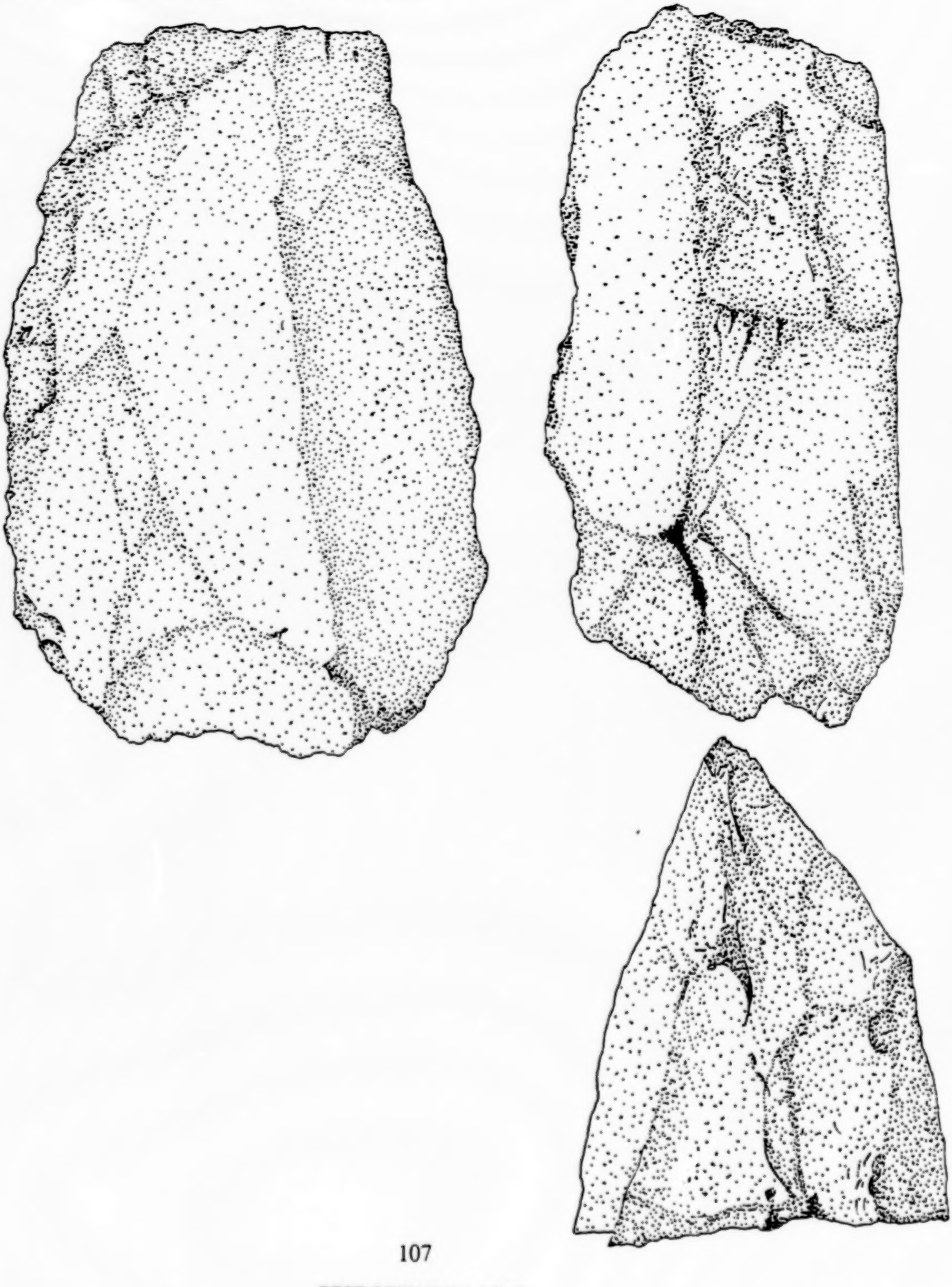

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Figure 27 Basalt Core Specimen 626-87-S-8.

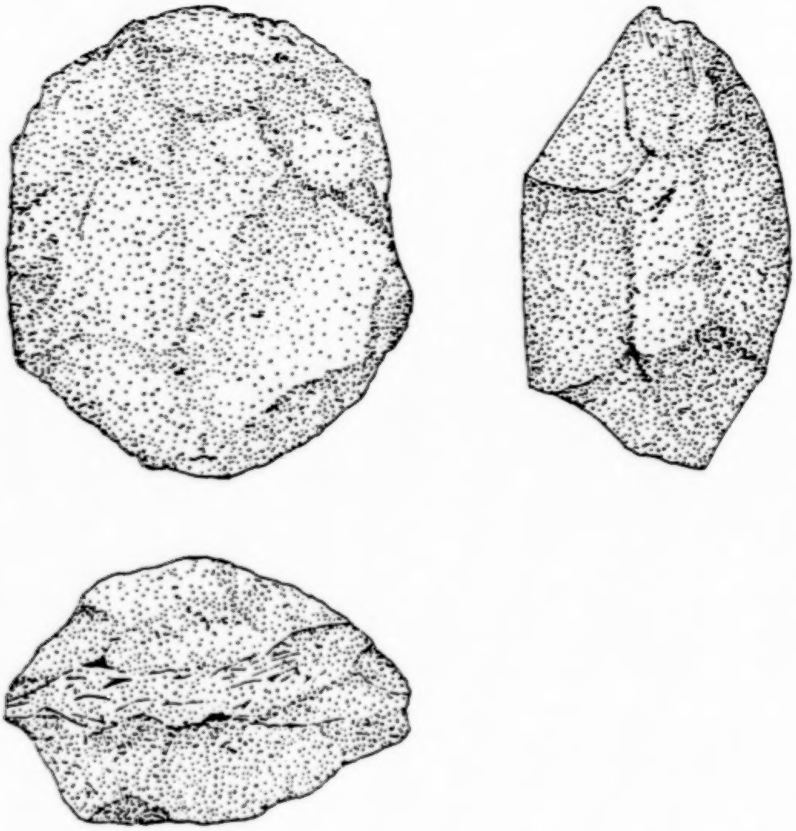


Figure 28 Pestle Specimen 626-87-S-25.

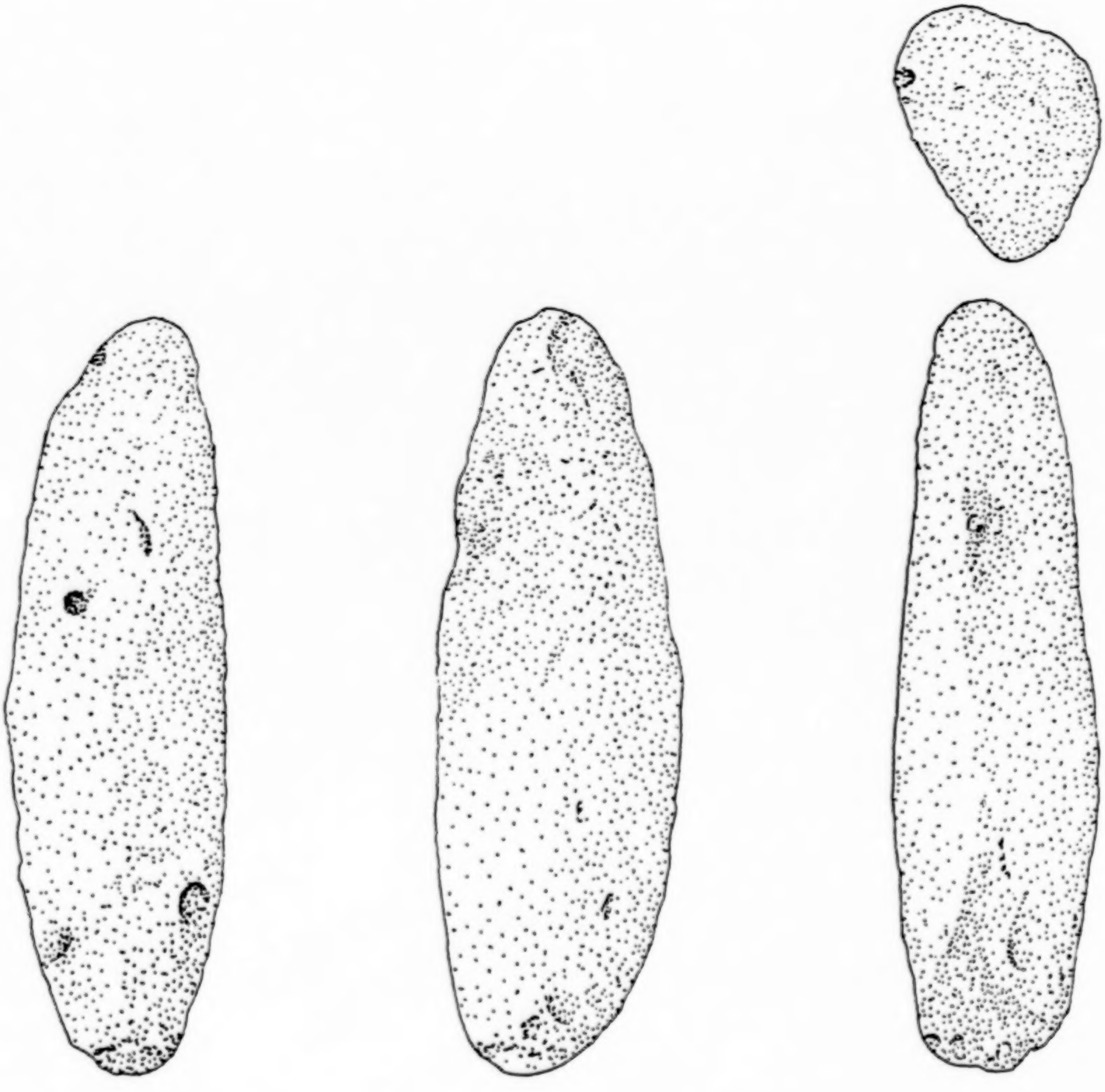


Figure 29 Maul Specimen 626-87-S-28.

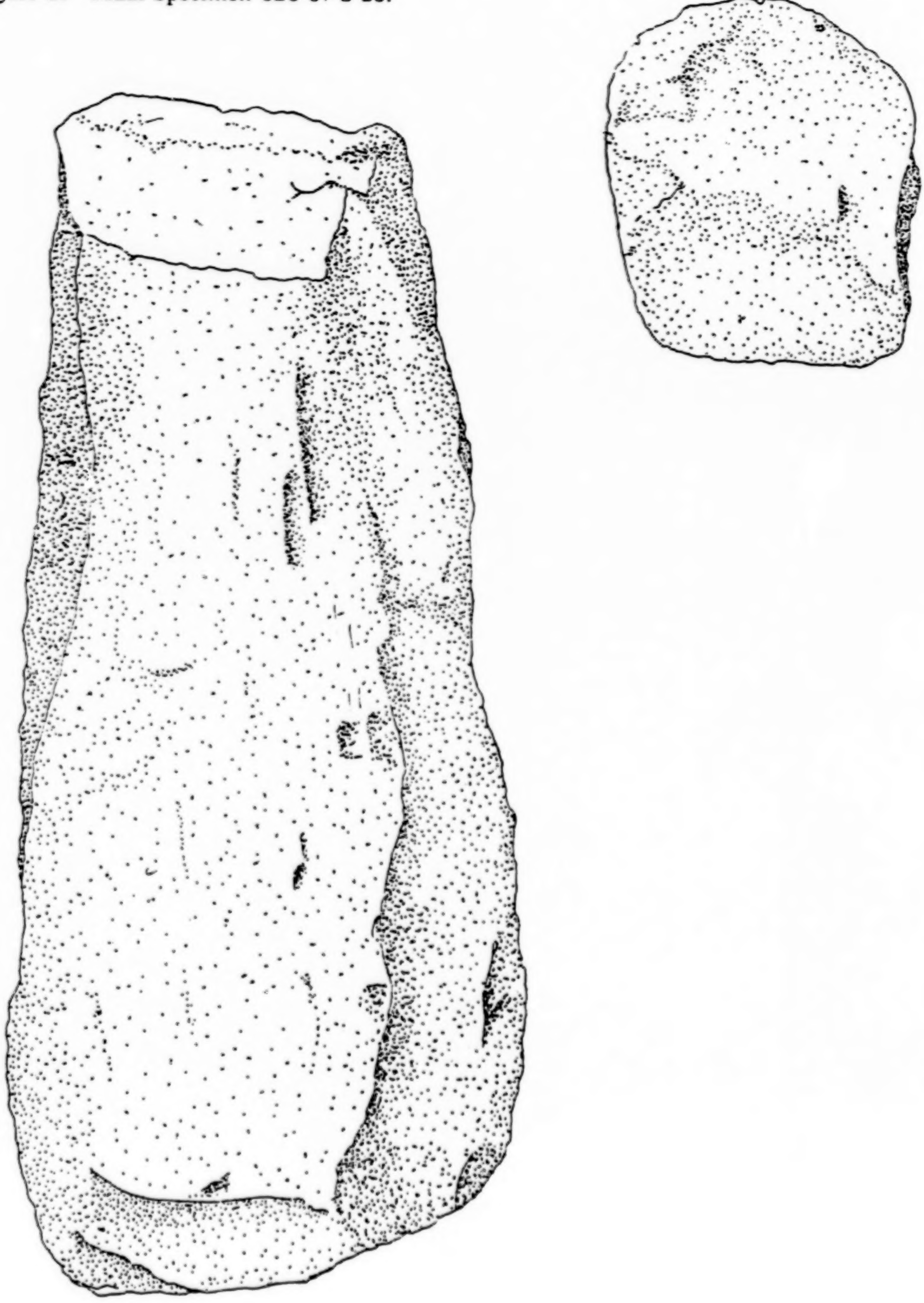


Table 22 Recorded Data for Pestles and Mauls.

Artifact 626-87-n	S-3	S-25	S-28	S-53	S-67
Provenience[1]	27N/10E	215S/267E	167S/240E	(146S/193E)[2] In CRF 20	(30S/92E) In CRF 19
Tool type	Maul	Pestle	Maul	Maul	Pestle
Completeness	fragment	complete	fragment	fragment	fragment
Length (mm)	121.8	105.2	191.1	111.8	39.6
Width (mm)	80.8	33.9	89.6	81.5	62.6
Thickness (mm)	80.0	29.5	64.4	65.4	51.0
W/L Ratio	0.66	0.32	0.47	0.73	1.58
T/L Ratio	0.66	0.28	0.34	0.58	1.29
Weight (g)	170.0	146.0	1661.0	147.0	170.0

[1] Provenience data rounded to nearest whole meter designation.

[2] Data in parentheses indicate center location of CRF.

and weighs 1,661 grams. The lateral edges seem to be girdled longitudinally, as if to provide for a better grip when using the tool.

Hammerstones

Hammerstones show evidence of percussive use on at least one end or lateral edge. Use wear is relatively localized and not broadly distributed. This indicates some degree of controlled percussion. Four hammerstones were collected from the Peninsula Site (Table 23). Specimen 626-87-S-39 is the largest of these, weighing 2,403 g, and very likely would have required two hands to be used (Figure 30). Specimens 626-87-S-33 and 626-87-S-30 are more intermediate in size, weighing 1,225 and 1,035 g respectively. The former has three faces, and the latter may be a mano blank (Figure 31). Specimen 626-87-S-56 weighs 626 g and also appears to have been used as a mano.

Table 23 Recorded Data for Hammerstones.

Artifact 626-87-n	S-30	S-33	S-39	S-56
Provenience[1]	168S/234E	195S/259E	237S/291E	(32S/67E)[2] In CRF 18
Completeness	complete	complete	complete	fragment
Length (mm)	110.8	118.7	201.2	62.3
Width (mm)	83.2	108.9	112.5	83.5
Thickness (mm)	72.5	62.3	88.6	49.5
W/L Ratio	0.75	0.92	0.56	1.34
T/L Ratio	0.65	0.52	0.44	0.79
Weight (g)	1,035.0	1,125.0	2,403.0	626.0
Other tool type	No	No	Ground facets	Mano

[1] Provenience data rounded to nearest whole meter designation.

[2] Data in parentheses indicate center location of CRF.

Figure 30 Hammerstone Specimen 626-87-S-39.

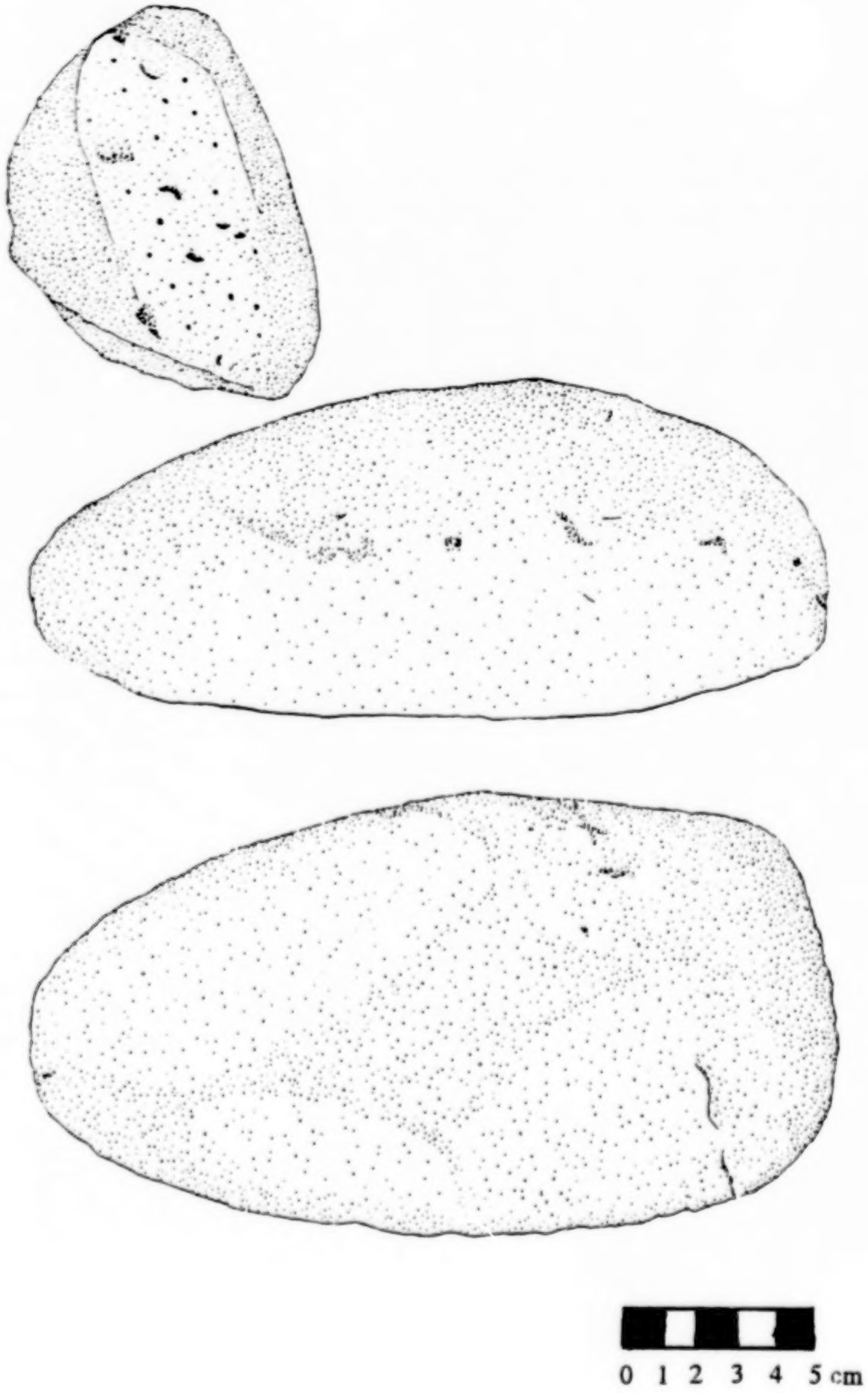
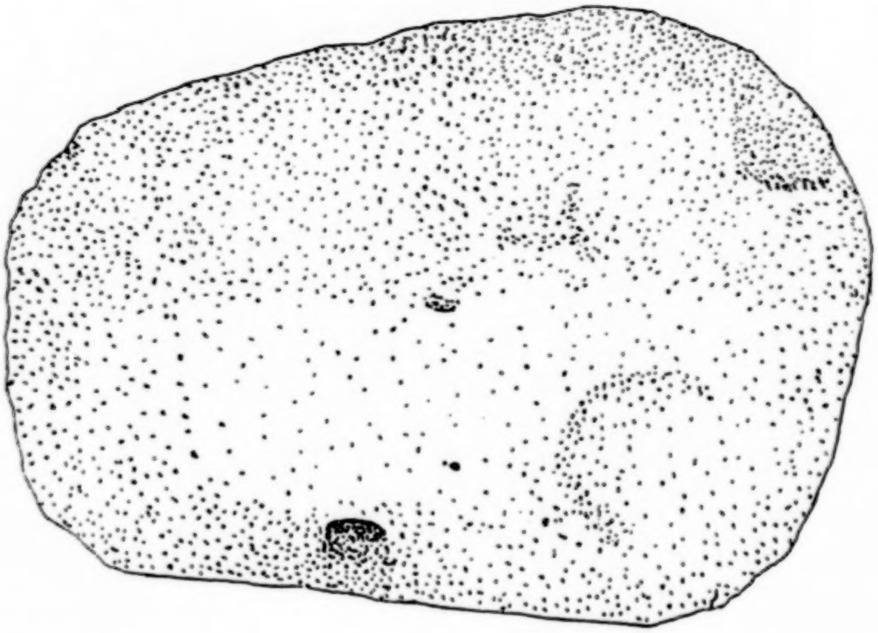
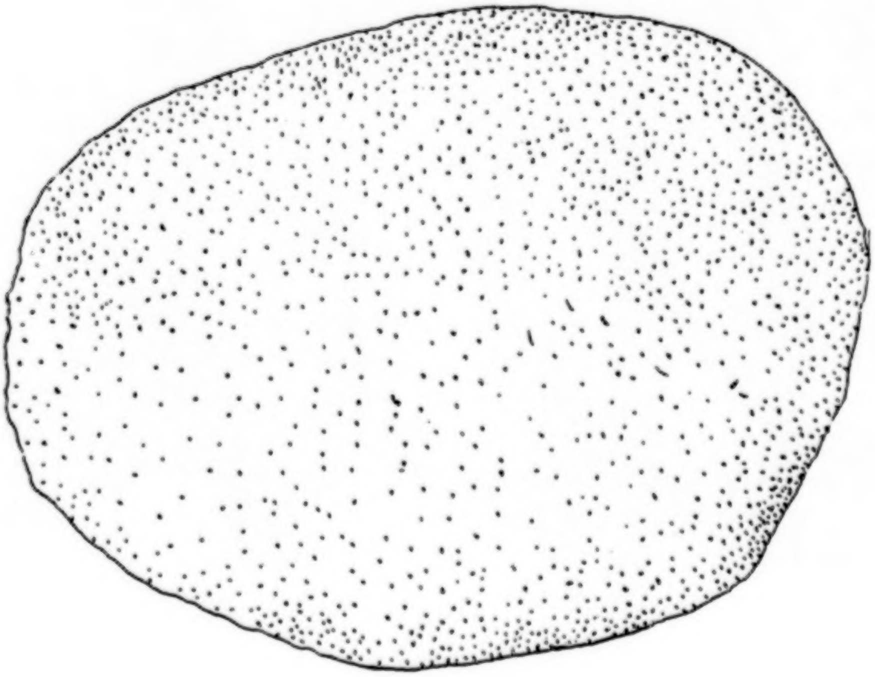


Figure 31 Hammerstone Specimen 626-87-S-30.





Edge Abraders and Edge-Altered Cobbles

Edge abraders are cobbles having edges with smooth polished facets, apparently the result of use as abraders. Two fragmentary specimens, 626-87-S-29 and 626-87-S-32, were collected from the Peninsula Site (Table 24, Figure 32). Edge-altered cobbles are artifacts with edge modification, apparently the result of the edges having been pecked and not the result of use as a tool. Two specimens, 626-987-S-24 and 626-87-S-64, were collected from the Peninsula Site (Table 24, Figure 33).

Table 24 Recorded Data for Edge Abraders and Edge-Altered Cobbles.

Artifact 626-87-n	S-24	S-29	S-32	S-56
Provenience[1]	190S/240E	197S/240E		
Edge modification	Altered	Abrader	Abrader	Altered
Completeness	complete	partial	partial	partial
Length (mm)	140.7	113.8	91.1	131.1
Width (mm)	107.6	97.2	58.2	108.8
Thickness (mm)	51.5	33.3	22.9	45.9
W/L Ratio	0.76	0.85	0.64	0.83
T/L Ratio	0.37	0.29	0.25	0.35
Weight (g)	1,116.0	463.0		966.0

[1] Provenience data rounded to nearest whole meter designation.

[2] Data in parentheses indicate center location of CRF.

Bifacial Hammer-Pecking-Abrading-Rubbing Stones

These tools are bifacially flaked stones with one or more edges or ends showing evidence of hammering, pecking, abrading, or rubbing. In general they are functionally similar to the hammer, anvil, and rubbing stones identified by Trygg (1971:33-42). They are also quite similar to the tools identified by Hayden and Nelson (1981:87) as used by contemporary Guatemalans in the manufacture of mortars and metates.

Hayden and Nelson (1981:87) identified three size categories of mortar/metate manufacturing tools. The largest and heaviest are two-handed chopping implements weighing about 2 kg and used for roughing out and shaping. The heavy hammerstone previously described would fall into this category (Figure 30). Somewhat lighter one-handed implements weighing about 1 kg are used in the intermediate stages of mortar or metate manufacture. The intermediate sized hammerstones previously described would fall into this category. Both these and the heavier type often have a convex end or a point or narrow gouge at the tip. The tools used for light pecking and smoothing in the final manufacturing stages weigh about 0.5 kg or less. These finishing stones often take a "quasi-clam shell shape" with rounded edges displaying abraded surfaces.

The seven bifacial hammer-pecking-abrading-rubbing stones collected from the Peninsula Site range in weight from 147 to 599 g (Table 25). The heaviest one, 626-87-S-15, has a pointed

Figure 32 Edge Abrader Specimen 626-87-S-29.

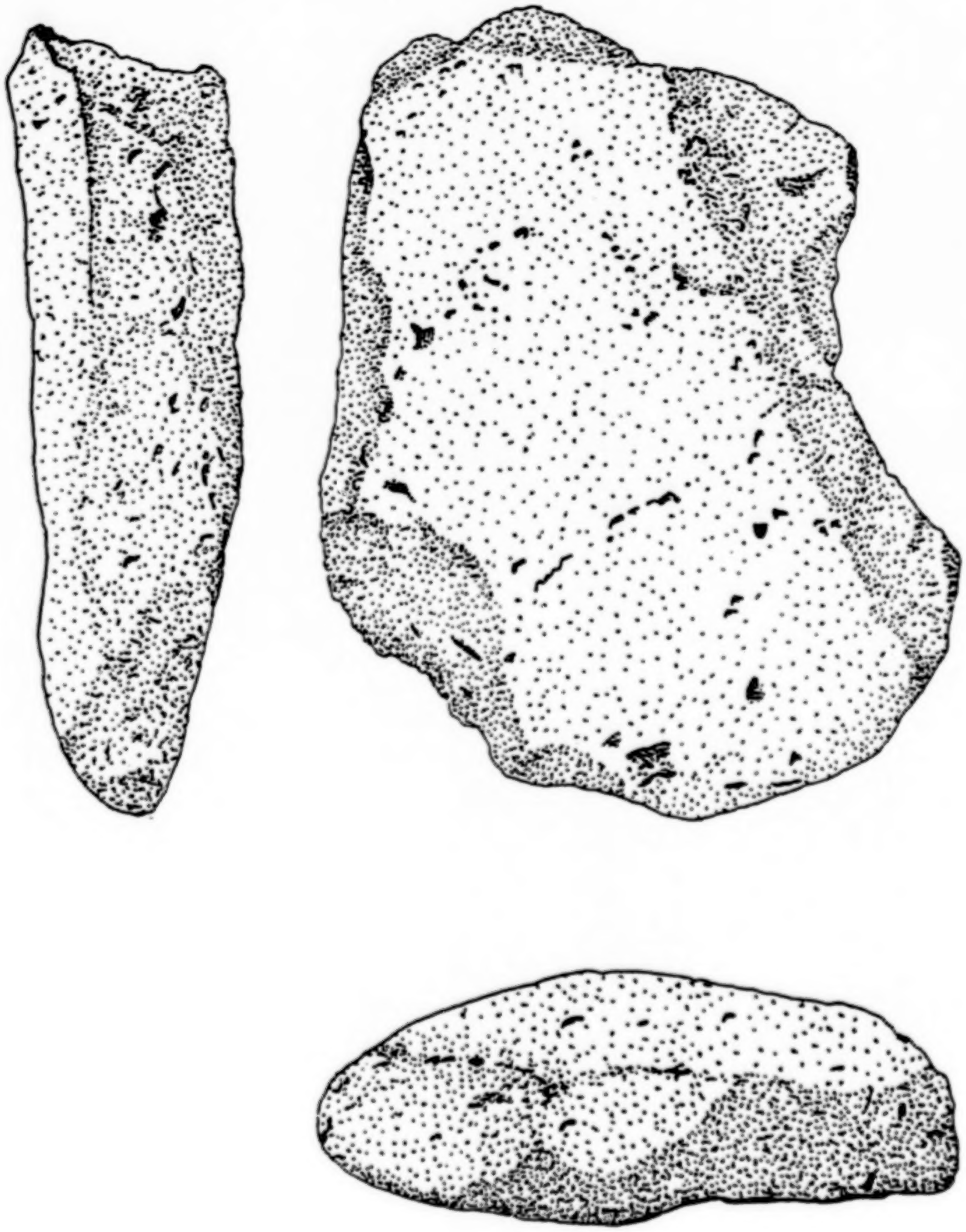


Figure 33 Edge-Altered Cobble Specimen 626-87-S-24.

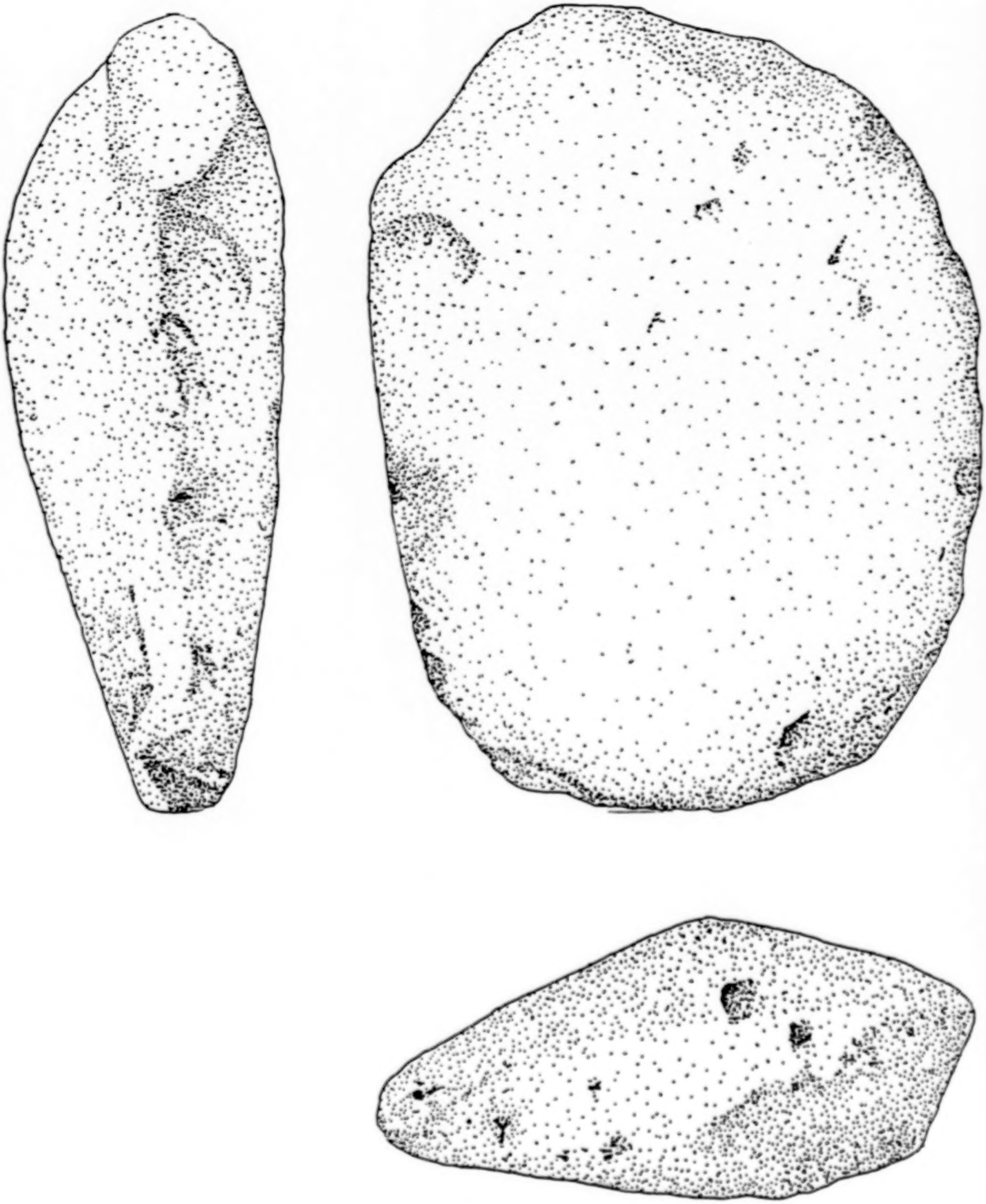


Table 25 Recorded Data for Bifacially Formed Hammer-Pecking-Abrading-Rubbing Stones.

Artifact 626-87-n	S-14	S-15	S-60	S-55	S-58	S-59	S-63
Provenience[1]	28N/4E	2S/55E	(76S/68E) In CRF 11	2 m south of CRF 13	(24S/90E) Wall CRF 15	(76S/68E) In CRF 11	(87S/138E) In CRF 10
Length (mm)	98.3	94.5	80.0	79.3	82.3	81.9	71.8
Width (mm)	70.4	89.4	58.8	59.3	48.4	57.2	48.9
Thickness (mm)	54.0	81.4	32.5	44.0	38.3	43.7	29.1
W/L Ratio	0.72	0.95	0.74	0.75	0.59	0.70	0.68
T/L Ratio	0.55	0.86	0.41	0.55	0.47	0.53	0.41
Weight (g)	348.0	599.0	188.0	268.0	214.0	531.0	147.0
Parent artifact	flake	core	flake?	core	flake	flake	flake
Primary edge	end	end	end	side	side	side	side
Edge shape	convex	point	convex	convex	convex	convex	convex

[1] Provenience data rounded to nearest whole meter designation.

[2] Data in parentheses indicate center location of CRF.

end and fingerhold depressions (Figure 34). This artifact is somewhat irregular in shape. The other six specimens are more quasi-clam shell shaped. The primary used edge on all these is convex. On two, 626-87-S-14 and 626-87-S-60, the primary used edge is on the end. On the other four, 626-87-S-55, 626-87-S-58, 626-87-S-59, and 626-87-S-63, it is on the side. One side utilized specimen, 626-87-S-58, also has ground facets at each end (Figure 35). The heaviest of the six quasi-clam shell shaped specimens, 626-87-S-59, shows less use wear than the other and seems to be a larger version of them (Figure 36). Two basalt cores, 626-87-S-8 and 626-87-S-37, could be preforms for this tool type (Table 21, Figure 27).

Unformed or Minimally Formed Hammer-Anvil-Rubbing Stones

These tools show minimal modification other than that resulting from use and evidenced by battered and chipped surfaces, irregular rubbing facets, or pits at least 2 mm deep in one or both faces. They are similar to the hammer, anvil, rubbing stones identified by Trygg (1971:34). They differ from the bifacially flaked hammer-pecking-abrading-rubbing stones in not being bifacially flaked and not having a quasi-clam shell shape. Three unformed or minimally formed hammer-anvil-rubbing stones were collected from the Peninsula Site. All three are also classified as manos and exhibit multiple, small smooth facets, often joined at obtuse angles (Table 26). Specimen 626-87-S-23 is similar to the small globular subtype identified by Trygg (1971:39) (Figure 37a). Specimens 626-87-S-66 and 626-87-S-2 are more hemispherical (Figure 37b). Both have generally round shapes, an attribute Trygg (1971:52) associates with hammer-anvil-rubbing stones found in Modoc territory. By contrast, she identifies angular forms as being associated with Northern Paiute territory.

Figure 34 Bifacially Formed Hammer-Pecking-Abrading-Rubbing Stone Specimen 626-87-S-15.

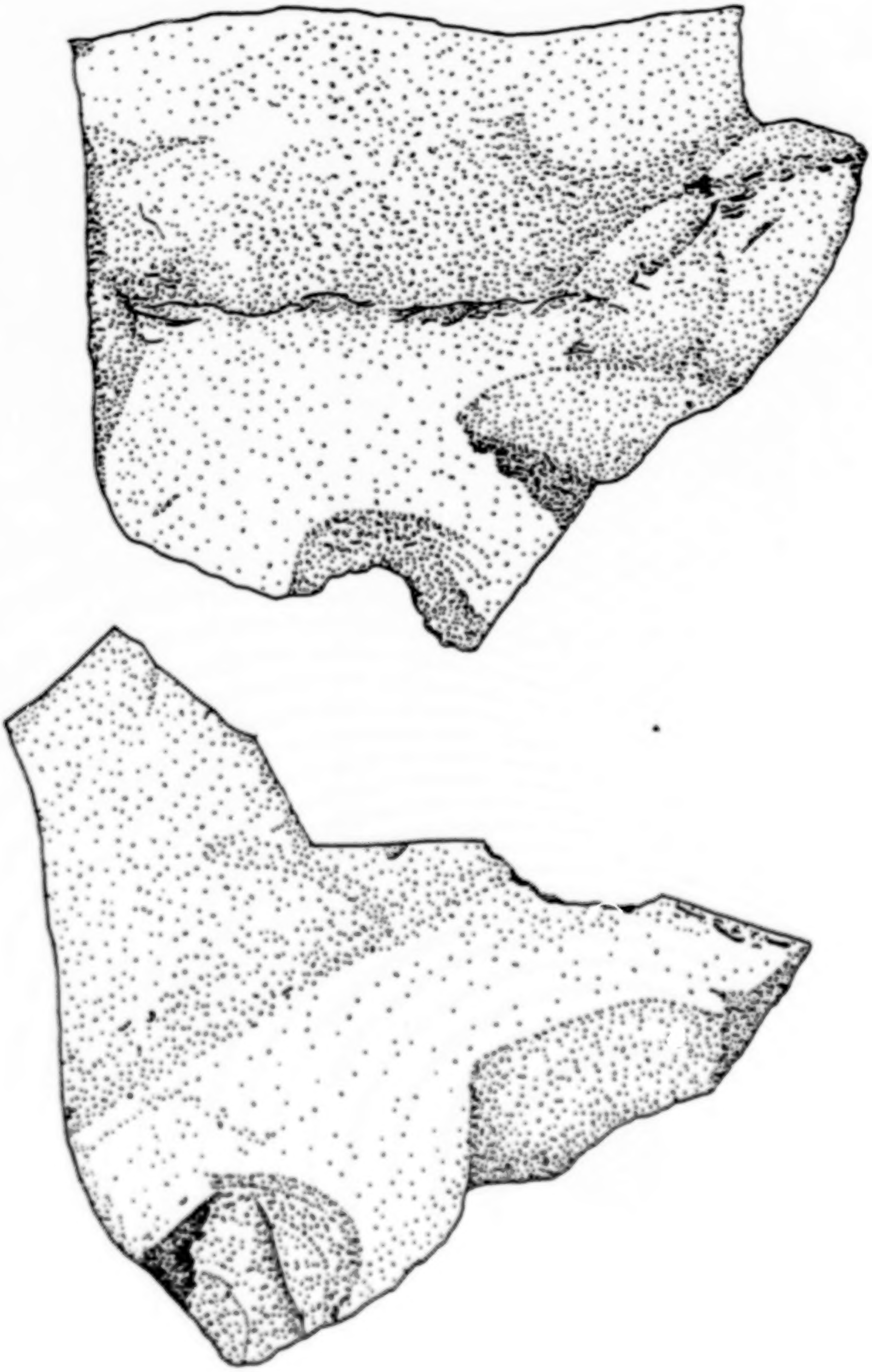


Figure 35 Bifacially Formed Hammer-Pecking-Abrading-Rubbing Stone Specimen 626-87-S-58.

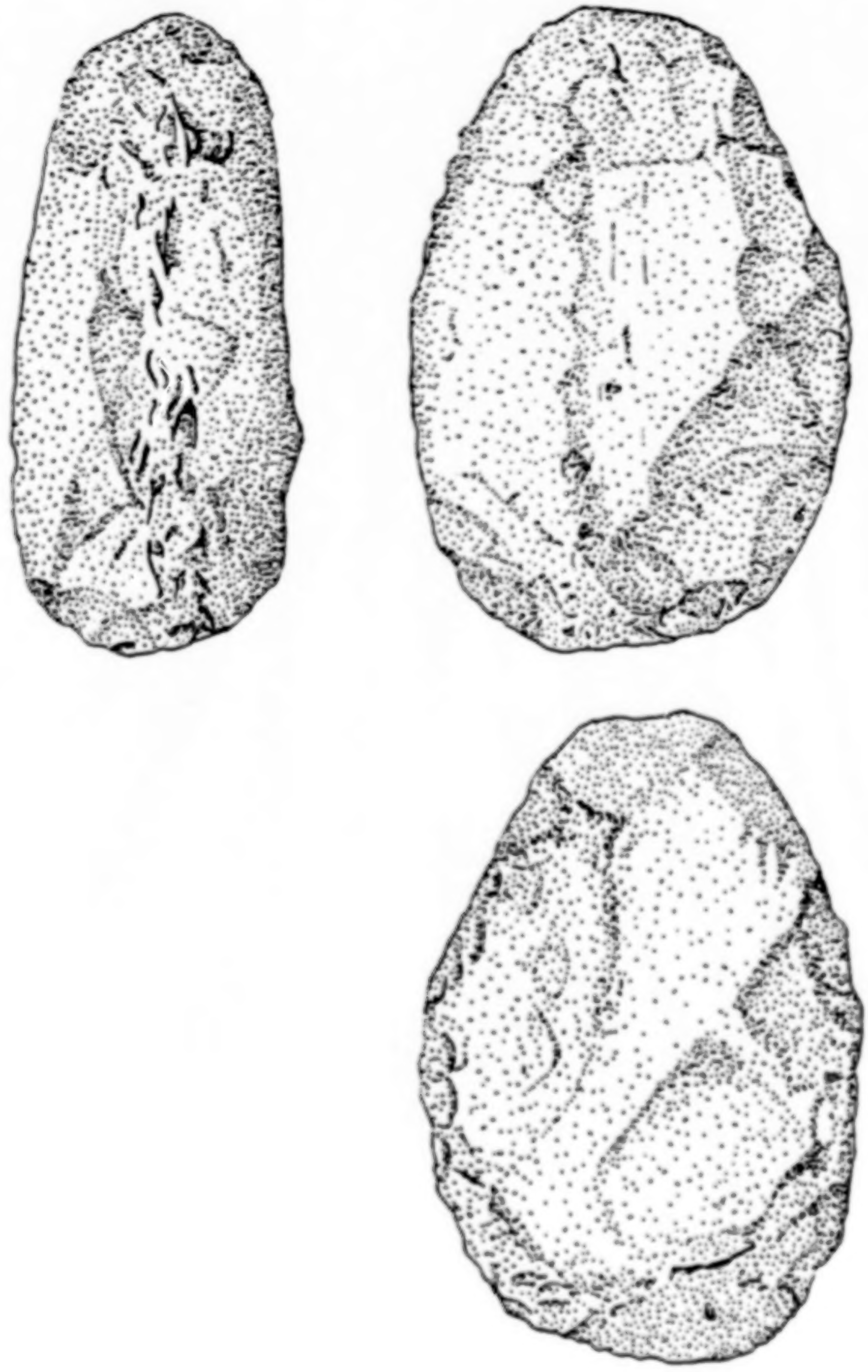


Figure 36 Bifacially Formed Hammer-Pecking-Abrading-Rubbing Stone Specimen 626-87-S-59.

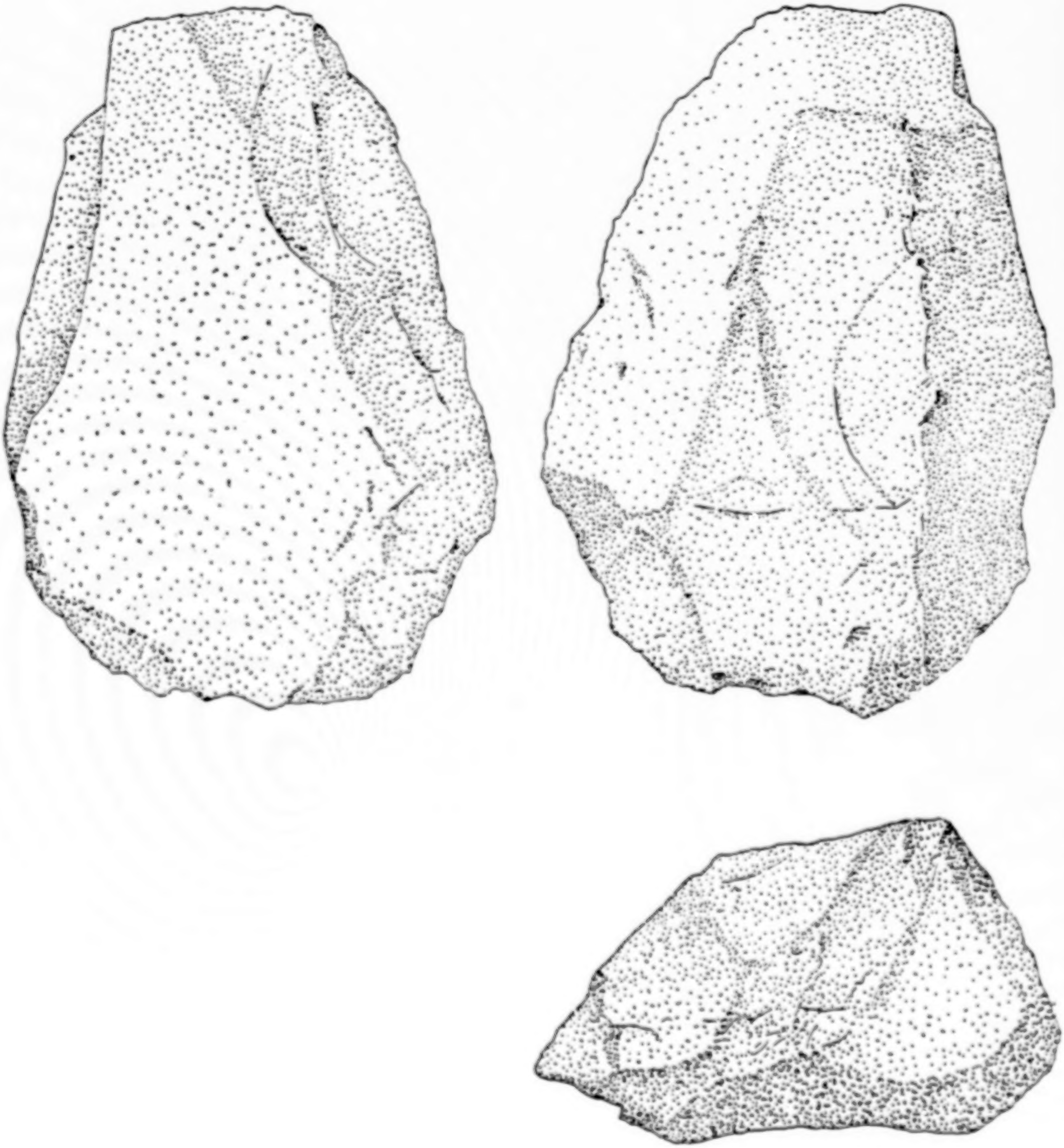
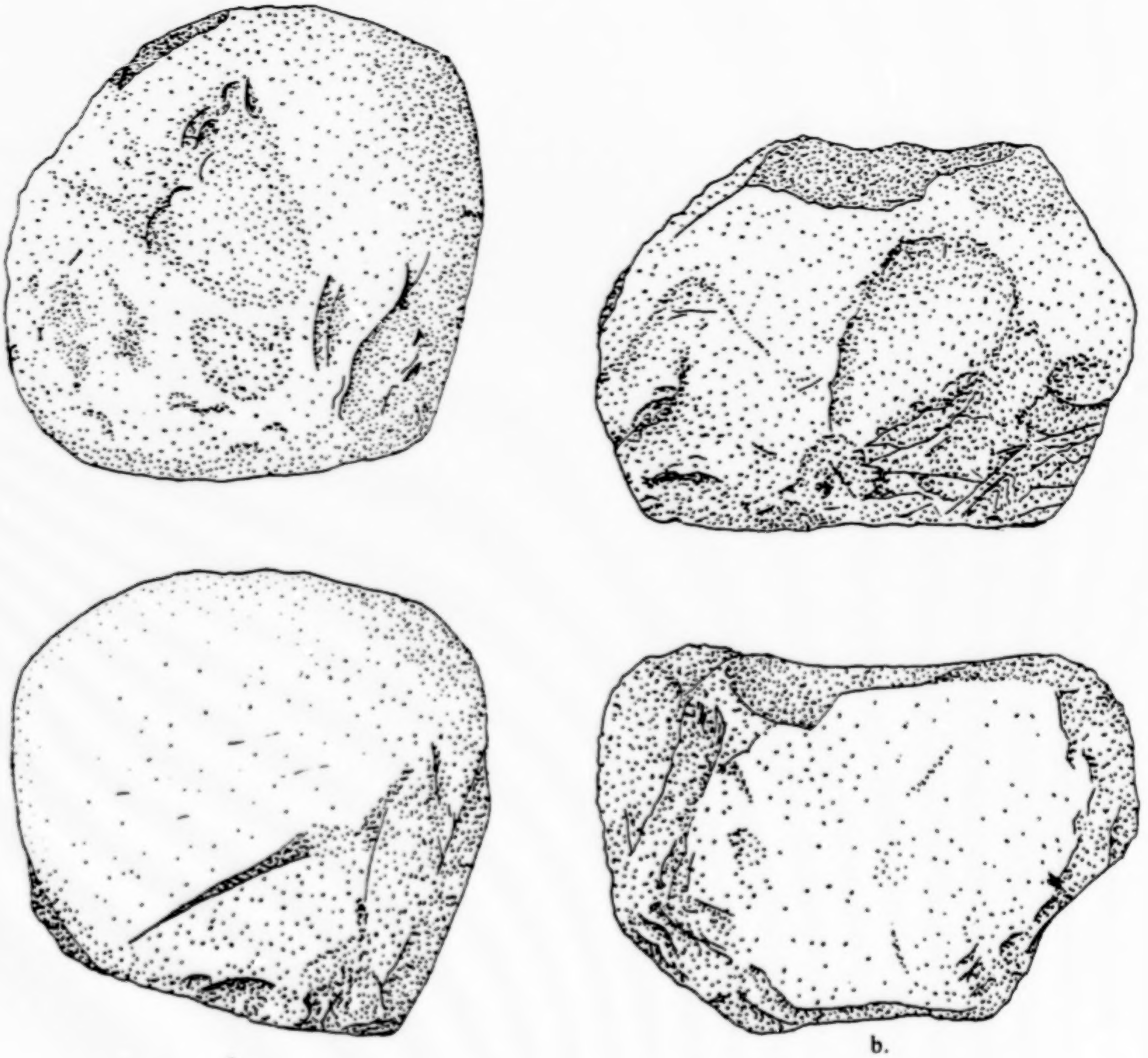


Figure 37 Unformed or Minimally Formed Hammer-Anvil-Rubbing Stones and Handled Manos.



a.

b.

a. 626-87-S-23 b. 626-87-S-66

Table 26 Recorded Data for Unformed or Minimally Formed Hammer-Anvil-Rubbing Stones (UFHAR) and Handled Manos.

Artifact 626-87-n	S-2	S-23	S-35	S-66	S-69
Provenience[1]	15N/2E	195S/261E	87S/142E	(30S/92E)[2] In CRF 19	(30S/105E)[2] In CRF 7
Number of faces	1	1	1	1	1
Shoulder type[3]	S-SL	NS	NS	SL	S
Length (mm)	93.8	65.3	92.2	58.1	71.8
Width (mm)	77.4	59.2	69.1	46.8	48.9
Thickness (mm)	75.9	61.2	61.4	59.0	29.1
W/L Ratio	0.83	0.91	0.75	0.81	0.68
T/L Ratio	0.81	0.94	0.67	1.02	0.41
Weight (g)	726.0	387.0	490.0	203.0	147.0
Facet Profile					
Longitudinal	Convex	Flat	Convex	Flat	Flat
Transverse	Peaked	Flat	Convex	Flat	Flat
Tool types	Mano UFHAR	Mano UFHAR	Mano	Mano UFHAR	Mano

[1] Provenience data rounded to nearest whole meter designation.

[2] Data in parentheses indicate center location of CRF or approximate location of CRF.

[3] S = shouldered, SL = slightly shouldered, NS = not shouldered.

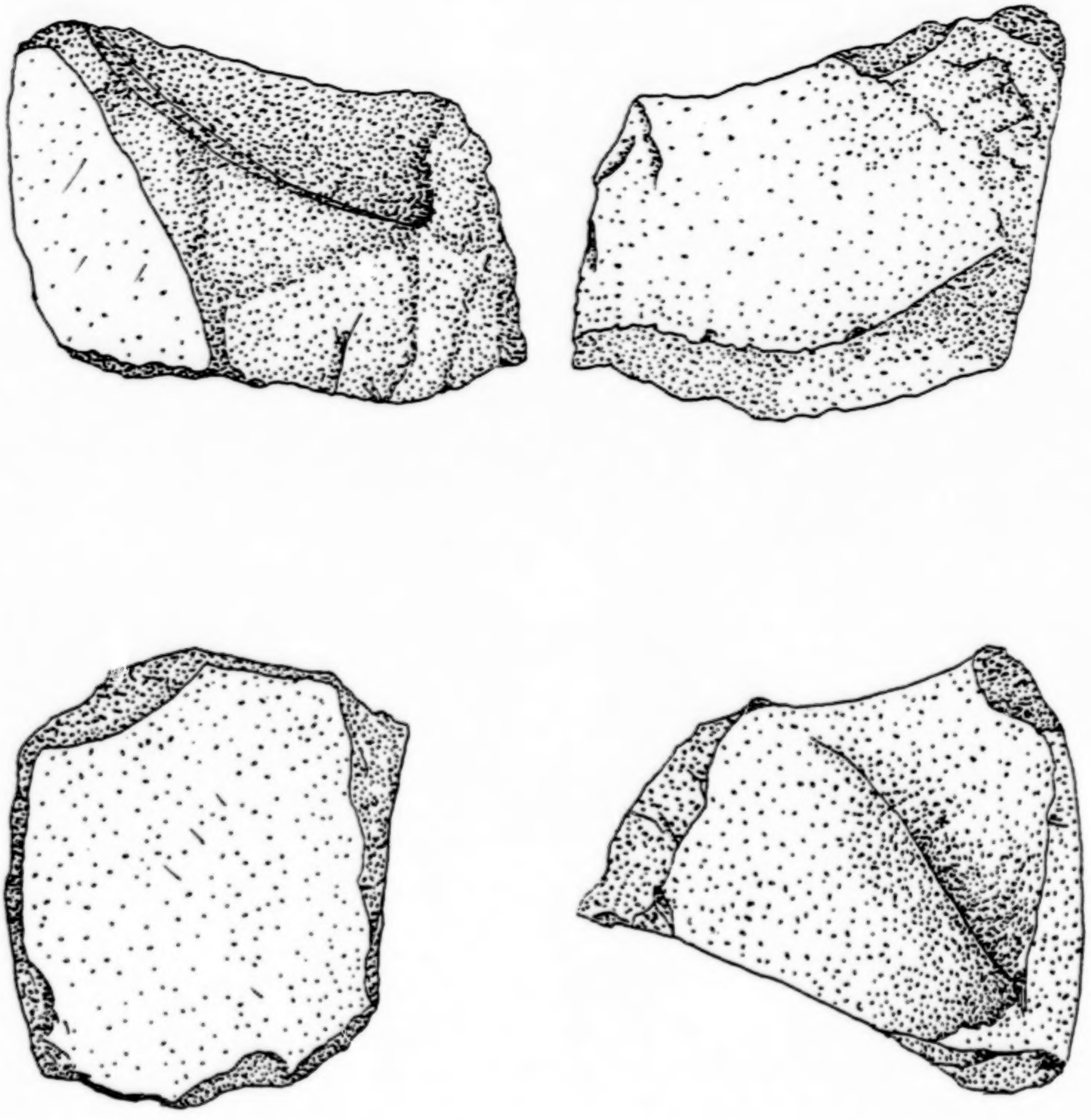
Handled Manos

Manos are cobble-size stones with at least one flat or convex face showing evidence of grinding. A handled mano has a distinct grasping element so that the tool could be used without scraping one's fingers on a grinding slab or similar surface. This grasping element can be a protuberance, flange, or circumferential depression.

Five handled manos were recovered from the surface of the Peninsula Site (Table 26). Specimen 626-87-S-69 is the smallest of these tools recovered, weighing only 203 g (Figure 38). It is shouldered with a single facet having flat longitudinal and transverse profiles. This facet exhibits slightly rough use-wear interpreted as being the result of use directly against a grinding slab. The grasping element is reminiscent of the horned manos, identified by Cressman (1956:420), albeit with only one horn. This specimen, however, is also more angular and apparently was made on a large, thick parent flake subsequently shaped by flaking.

Specimen 626-87-S-66 weighs 335 g and is slightly shouldered with a single facet having flat profiles (Figure 37b). Trygg (1971:22) found the facet profile type exhibited by 626-87-S-66 and 626-87-S-23 to be associated with the territory of the Tule Lake Modoc. The facet on 626-87-S-66 is fairly smooth over about two-thirds of its surface. The use wear is somewhat polished with a bit of sheen to it. The grasping element is hemispherical and exhibits use wear, indicating that this artifact was also used as a unformed hammer-anvil-rubbing stone.

Figure 38 Handled Mano Specimen 626-87-S-69.



The combination mano and hammer-anvil-rubbing tool form, as well as manos of hemispherical or globular shapes, were found by Trygg (1971:23, 37) to be associated with the territory of the Tule Lake Modoc.

The parent stone from which 626-87-S-66 was made seems to have been a small cobble. There appears to be some rounding at the interface of the grasping element and the most polished portion of the flat facet. This rounding is slightly rough. The polished flat facet with a sheen and the wear at the aforementioned interface might indicate that an intermediate material, such as a hide, separated this tool from the flat surface on which it was used.

Specimen 626-87-S-23 weighs 387 g and is non-shouldered with a single facet flat in both profiles (Figure 37a). The facet is smooth in the center and then grades to slightly rough along the margins. The wear in the center is somewhat polished. The grasping element is globular and shows use wear indicating that it was also used as an unformed hammer-anvil-rubbing stone. The parent artifact seems to have been a small cobble. A portion of the flat facet is pitted. This tool seems to fall into Trygg's (1971:15) special attribute category of a small globular mano.

Specimen 626-87-S-35 weighs 490 g and is non-shouldered with a single facet convex in both profiles (Figure 39). This facet is not smooth and has four step-like ridges along the sides radiating from an apparent striking platform at one end. The parent artifact of this tool appears to have been a large, thick flake struck off a cobble. The wear on the facet is semi-smooth and somewhat polished. The wear is not continuous across the facet and is primarily confined to the step-like ridges. The grasping element is somewhat conical despite the evidence of flake scars. There is some rounding at the interface of the grasping element and most of the single facet. This rounding is semi-smooth to smooth.

Specimen 626-87-S-2 weighs 726 g and is slightly shouldered with a single facet. This facet has convex longitudinal and peaked transverse profiles. This tool falls into Trygg's (1971:115) special attribute category of a peaked mano, which she found associated with the Modoc territory in general and the Clear Lake Modoc in particular. Use wear on the facet is primarily restricted to its peaked portion and has a smooth, polished sheen. The grasping element is hemispherical and shows evidence of flake scars. The parent stone seems to have been a cobble.

Unhandled Manos

Unhandled manos are similar to handled manos except that they lack a distinctive grasping element. Six surface specimens were recovered from the Peninsula Site (Table 27). One subsurface specimen, 626-87-8-1-23, was recovered from CRF 15. This is a fire-cracked fragment of an end of a small cobble, weighing 17.19 grams. One facet, flat in both profiles, remains. Use wear is semi-smooth.

Figure 39 Handled Mano Specimen 626-87-S-35.

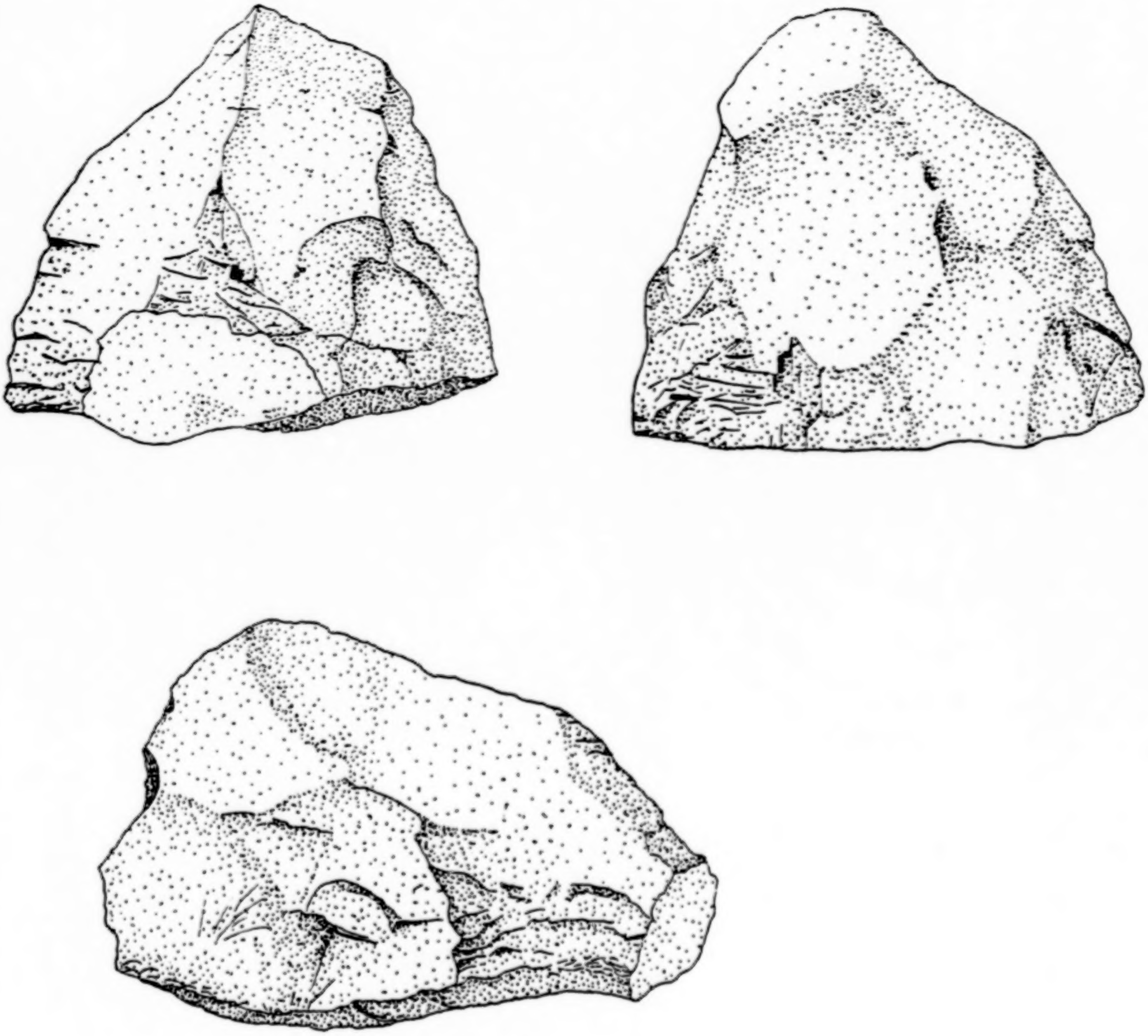


Table 27 Recorded Data for Surface-Collected Unhandled Manos.

Artifact 626-87-n	S-31	S-50	S-56	S-57	S-65	S-70
Provenience[1]	68S/234E	204S/286E	(32S/87E)[2] In CRF 18	(32S/87E)[2] In CRF 18	(30S/92E)[2] In CRF 19	(30S/105E)[2] In CRF 7
Number of faces	1	1	2	2	1	1
Shoulder type[3]	NS	NS	NS-NS	NS-NS	NS	NS
Length (mm)	118.6	93.0	62.3	110.1	51.1	80.3
Width (mm)	70.6	81.3	83.5	68.4	88.0	75.0
Thickness (mm)	49.2	51.4	49.5	47.3	60.2	49.6
W/L Ratio	0.60	0.87	1.34	0.62	1.72	0.93
T/L Ratio	0.41	0.55	0.79	0.43	1.18	0.62
Weight (g)	660.0	476.0	626.0	348.0	307.0	365.0
Facet Profile						
Longitudinal	Convex	Flat	Flat/Convex	Flat/Convex	Flat	Flat
Transverse	Flat	Convex	Convex/Flat	Flat/Convex	Flat	Flat
Other tool type	None	None	Hammerstone	None	None	None

[1] Provenience data rounded to nearest whole meter designation.

[2] Data in parentheses indicate center location of CRF or approximate location of CRF

[3] S = shouldered, SL = slightly shouldered, NS = not shouldered.

Specimens 626-87-S-65 and 626-87-S-70 are non-shouldered fragments with single facets flat in both profiles, a characteristic Trygg (1971:22) associated with the territory of the Tule Lake Modoc. Specimen 626-87-S-50 is a half-complete fragment of a non-shouldered, single faceted mano with a flat longitudinal cross-section and convex transverse cross-section (Figure 40). Trygg (1971:22) found this type of facet profile associated with the territory of the Warner Valley Paiute. Use wear is semi-smooth to polished. Specimen 626-87-S-31 is a complete, non-shouldered, single-faceted mano with a convex longitudinal cross-section and a flat transverse cross-section (Figure 41). This specimen weighs 660 g and is almost 12 cm long. Use wear is slightly rough. A pit, which may have functioned as a fingerhold depression, is located along one lateral edge. The opposite lateral edge appears to have been lightly pecked.

Specimens 626-87-S-56 and 626-87-S-57 are non-shouldered fragments with two facets. Trygg (1971:19) found bifacially faceted, non-shouldered manos to be associated with the territory of the Warner Valley Paiute. Specimen 626-87-S-56 is an end fragment with smooth, polished facets intersecting at obtuse angles. One facet, on the bottom of the cobble, is flat in longitudinal cross-section and convex in transverse cross-section. Again, Trygg (1971:22) found this facet profile pattern to be associated with the territory of the Warner Valley Paiute. The other facet is on the curving slope from the bottom of the cobble to its end. This facet is convex in longitudinal cross-section and flat in transverse cross-section. The other bifacially faceted specimen, 626-87-S-57, is a midsection fragment. The facets are on opposite sides of the cobble fragment. One facet is flat in both

Figure 40 Unhandled mano specimen 626-87-S-50.

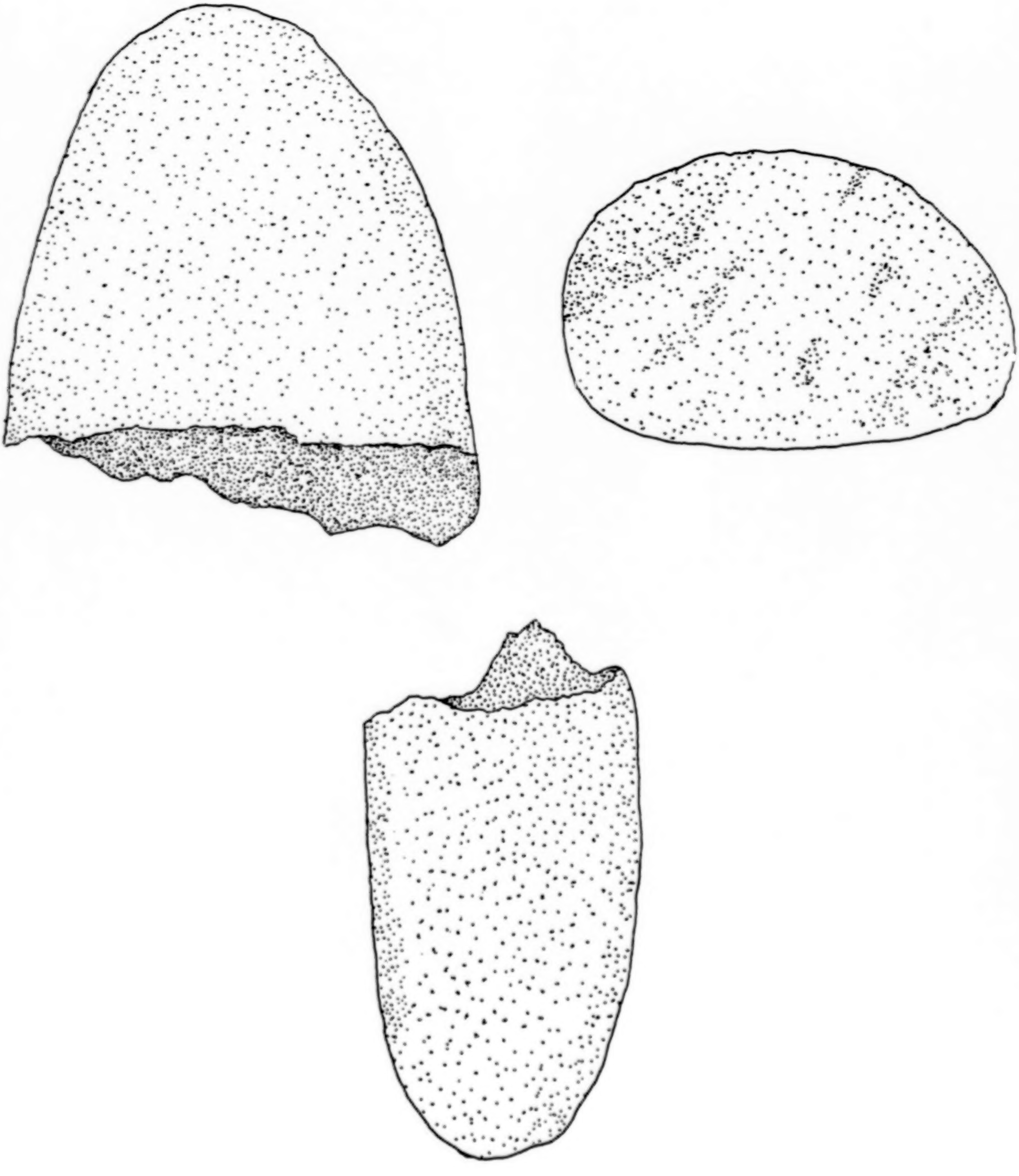
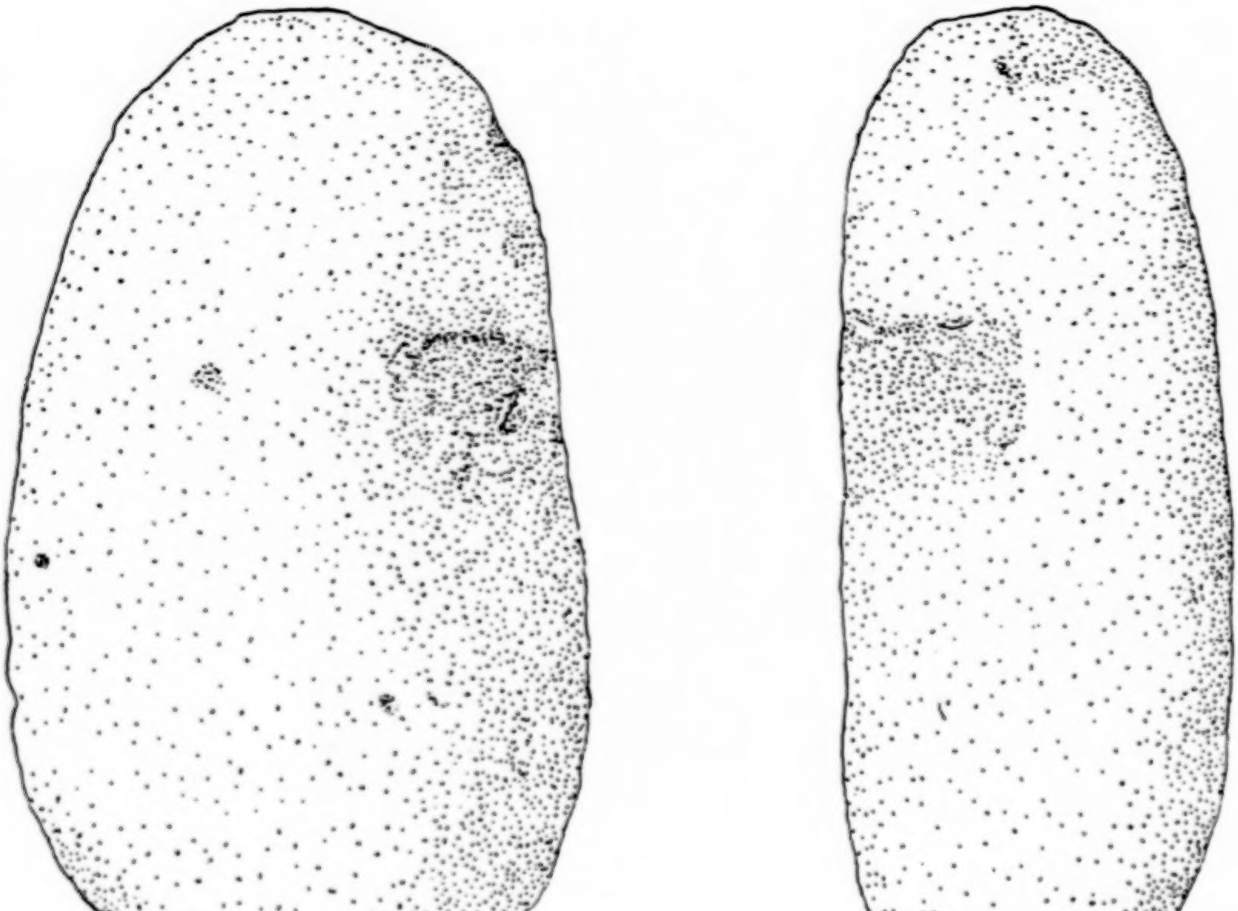


Figure 41 Unhandled mano specimen 626-87-S-31.



cross-sections, a pattern Trygg (1971:14) found associated with the territory of the Tule Lake Modoc. The other facet is convex in both cross-sections.

Spheroid

A spheroid is a stone naturally or artificially shaped into a spherical form. An index of sphericity is used here which Pettigrew (1985:109) attributes to L. R. Kittleman. This index is "computed as ratio of the average diameter (averaging length, width and thickness) to the maximum diameter (. . . the length)." Using this index, a perfect sphere has an index of 1.00 and spheroids are defined as having an index equal to or greater than 0.82. The one specimen recovered, 626-87-8-2-3, was from an excavation unit in CRF 15. It is basalt, weighs 15.79 g, and has dimensions of 24 x 21 x 18 millimeters. Its index of sphericity is 0.875. It appears to have been partially shaped by pecking.

Hopper Mortar Base

Hopper mortar bases are rock slabs or portions of boulders or bedrock that have a flat face exhibiting a distinct concavity worn by intentional manufacture or through grinding. An open-bottomed basket would have been placed over this base. This tool class is distinguished from other mortar and grinding surface tools at Peninsula Site using two main criteria. The first is defined as an Index of Circularity. This index is computed by measuring the maximum diameter and a diameter perpendicular to the maximum and then dividing the smaller by the larger. The second criteria is depth. These two criteria were used to group all the mortar and grinding surface tools at the Peninsula Site into distinguishable classes. Hopper mortar bases ranged in depth from 1.0 to 6.5 cm, with an Index of Circularity greater than 0.85.

Based on the above criteria, 26 hopper mortar bases were identified (Table 28). Some bases were on rocks small enough to be carried, such as Mortars 15 and 16 found in the vicinity of CRFs 15 and 16 (Appendix A, Figure A-8, A-9). Mortar 16 was found just inside the entrance to CRF 16. Others, such as Mortar 7, were on boulders that would have been difficult to carry (Appendix A, Figure A-9). Some, such as Mortar 19, were found on bedrock (Appendix A, Figure A-10). One boulder contained six hopper mortar bases, Mortars 8a-f, ranging in depth from 1 to 6 cm (Appendix A, Figure A-11). The mean width of all six was less than the width of any of the other hopper mortar bases. Hopper mortars were known ethnographically to have been used by the Klamath and Modoc.

Deep Mortars

Deep mortars have depths of 9.5 cm or greater and an Index of Circularity greater than 0.67. These differ from hopper mortar bases in that some specimens have openings more oval than circular and all are deep enough such that they could have been used without an open-bottomed basket. All specimens observed at the Peninsula Site were found on large boulders or bedrock and were probably not moved. The deepest mortar, Mortar 2, was a bedrock mortar found in CRF 1 (Appendix A, Figures A-1 and A-12). This mortar was 38.0 cm deep. Another deep mortar, Mortar 13a, was found on a boulder that also

Table 28 Mortars, Grinding Surfaces, and Enhanced Depressions.

	Designation		Diameter in centimeters					
Type	Mortar/GS	Feature	Max	Min	Max-Min	Mean	Circularity Index	Depth (cm)
Hopper Mortar Bases	8d	8	4.5	4.5	0.0	4.5	1.00	1.0
	20	45	15.0	13.0	2.0	14.0	0.87	1.0
	13b	28	17.0	16.0	1.0	16.5	0.94	1.0
	9a	9	12.0	11.0	1.0	11.5	0.92	1.5
	21	47	12.0	11.0	1.0	11.5	0.92	1.5
	30	64	14.0	13.0	1.0	13.5	0.93	1.5
	GS5	60	14.0	13.0	1.0	13.5	0.93	1.5
	8f	8	7.0	6.5	0.5	6.75	0.93	2.0
	22	48	15.0	15.0	0.0	15.0	1.00	2.0
	28	62	16.0	15.0	1.0	15.5	0.94	2.0
	19	40	16.0	16.0	0.0	16.0	1.00	2.0
	7	7	17.0	16.0	1.0	16.5	0.94	2.0
	8a	8	6.5	6.0	0.5	6.75	0.92	2.5
	8c	8	7.0	6.5	0.5	6.75	0.93	2.5
	29	63	13.0	12.0	1.0	12.5	0.92	2.5
	14	35	14.0	14.0	0.0	14.0	1.00	2.5
	15	36	15.0	15.0	0.0	15.0	1.00	3.0
	16	37	15.0	13.0	2.0	14.0	0.87	3.0
	13c	28	19.0	18.0	1.0	18.5	0.95	3.0
	23	56	13.0	12.0	1.0	12.5	0.92	3.5
	11	11	14.0	13.0	1.0	13.5	0.93	3.5
	8b	8	9.5	9.0	0.5	9.25	0.95	4.0
	25	58	15.0	15.0	0.0	15.0	1.00	5.0
	8e	8	11.0	11.0	0.0	11.0	1.00	6.0
	5	5	21.0	18.0	3.0	19.5	0.86	6.0
	10	10	23.0	22.0	1.0	22.5	0.96	6.5
Deep Mortars	12	17	18.0	12.0	6.0	15.0	0.67	9.5
	18	39	5.0	14.0	0.5	14.25	0.97	11.0
	1	1	22.0	20.0	2.0	21.0	0.91	11.0
	13a	28	26.0	24.0	2.0	25.0	0.92	15.0
	27	61	15.0	15.0	0.0	15.0	1.00	16.0
	6	6	39.0	31.0	8.0	35.0	0.79	21.5
	4	4	29.0	25.0	4.0	27.0	0.86	22.0
	3	3	22.0	20.0	2.0	21.0	0.91	28.5
	2	2	25.0	23.0	2.0	24.0	0.92	38.0

Table 28 Mortars, Grinding Surfaces, and Enhanced Depressions (continued).

	Number		Diameter in centimeters				Circularity	Depth
Type	Mortar/GS	Feature	Max	Min	Max-Min	Mean	Index	(cm)
Metates	GS3	43	20.0	8.0	12.0	14.0	0.40	0.5
(Grinding Slabs)	GS7	67	19.0	11.0	8.0	15.0	0.58	0.5
	GS4	44	20.0	17.0	3.0	18.5	0.85	0.5
	GS6	65	20.0	15.0	5.0	17.5	0.75	1.5
	GS2	42	38.0	23.0	15.0	30.5	0.61	2.0
	GS1	41	31.0	19.0	12.0	25.0	0.61	2.5
Enhanced	9c	9	5.0	4.0	1.0	4.5	0.80	0.5
Depressions	ED1c	52	5.0	4.0	1.0	4.5	0.80	2.5
	9d	9	10.0	9.0	1.0	9.5	0.90	2.5
	ED1a	52	7.0	7.0	0.0	7.0	1.00	3.0
	9b	9	9.0	9.0	0.0	9.0	1.00	3.0
	ED1b	52	4.0	4.0	0.0	4.0	1.00	4.0

contained two hopper mortar bases, Mortar 13b and Mortar 13c (Appendix A, Figure A-13). In all, nine deep mortars were identified ranging in depth from 9.5 to 38.0 centimeters.

Enhanced Depressions
Enhanced depressions differ from hopper mortar bases and deep mortars in that the only evidence of wear is around the lip of the concavities. These could be natural depressions that were intentionally altered so as to manufacture hopper mortar bases or deep mortars. Two boulders contained three enhanced depressions each. One of these boulders also contains a hopper mortar base, Mortar 9a, in addition to the three enhanced depressions, Mortars 9b-9d (Appendix A, Figure A-14).

Bowl-Shaped Mortars
Bowl-shaped mortars are portable and have basins completely hollowed out of stone. Only two fragmentary specimens were recovered from the Peninsula Site. One, 626-87-7-2-9, was recovered from excavation unit 75.5S/144.3E and is a small, thin fragment measuring 54.2 x 38.9 x 12.2 millimeters. The other specimen, 626-87-M26, is quite a bit larger and thicker, measuring 210.5 x 110.0 x 56.1 millimeters. This specimen was recovered from the surface.

Metates or Grinding Slabs
Metates are flat or somewhat flat faces smoothed from use as a grinding slab, which are found on flat rocks, boulders, or bedrock. Metates are shallow with a relatively low index of circularity. The six specimens found at the Peninsula Site had an Index of Circularity ranging from a low to 0.4 to a high of 0.85 and depths from 0.5 to 2.5 centimeters (Appendix A, Figure A-15).

9. OBSIDIAN ANALYSIS

An obsidian debitage sample from units 23.5/1.5E and 2.0E, placed inside CRF 1, and from units 195.0S and 197.0S/260.0E, placed inside CRF 15, underwent x-ray fluorescence (XRF) and obsidian hydration analyses. The results of these analyses are discussed below. Their significance relative to site chronology and function is discussed in the next chapter. Appendix D contains the laboratory report from Biosystems Analysis, Inc.

X-RAY FLUORESCENCE

X-ray fluorescence analysis indicates eight different obsidian sources are represented among the 32 debitage specimens submitted for analyis (Table 29, Figure 42). More than 75 percent of the specimens are of obsidian from either Drews Creek/Butcher Flat (18, or 56.3%) or Spodue Mountain (7, or 21.9%). More distant sources represented include Blue Mountain with two specimens (6.3%) and Buck Mountain, Cougar Butte, Grasshopper Flat, Witham Creek, and an unknown source with a single specimen (3.1%) each.

Table 29 Obsidian Sources Represented Among the Debitage Analysed.

	CRF 1		CRF 15		Total	
Source	N	Percent	N	Percent	N	Percent
Blue Mountain	0	-	2	12.5	2	6.3
Buck Mountain	1	6.3	0	-	1	3.1
Cougar Butte	1	6.3	0	-	1	3.1
Drews Creek/Butcher Flat	11	68.8	7	43.8	18	56.3
Grasshopper Flat	0	-	1	6.3	1	3.1
Spodue Mountain	2	12.5	5	31.3	7	56.3
Unknown	1	6.3	0	-	1	3.1

In general, CRF 15 obsidian debitage exhibits greater source variability than the CRF 1 debitage. However, given the relatively small sample of 16 specimens from each CRF, this pattern could be the result of sampling error. Two-thirds of the CRF 1 sample is from Drews Creek/Butcher Flat, while in the CRF 15 sample Drews Creek/Butcher Flat and Spodue Mountain are codominant (Figure 43). These two sources are the closest to the Peninsula Site, 27 km (17 mi) east-northeast and 45 km (28 mi) north-northwest respectively of the seven known sources represented (Table 30, Figure 44). These seven sources are in an north-east-south arc around the Peninsula Site, with the most distant being Buck Mountain, 85 km (53 mi) southeast, and Grasshopper Flat, 81 km (51 mi) south-southwest. It is interesting to note the absence of Silver Lake/Sycan Marsh obsidian even though this source is only 64–85 km (40–53 mi) to the north and is generally well represented in collections from Upper Klamath Basin sites (Craig Skinner, personal communication 1993).

Figure 42 Scatterplot of Obsidian Sources.

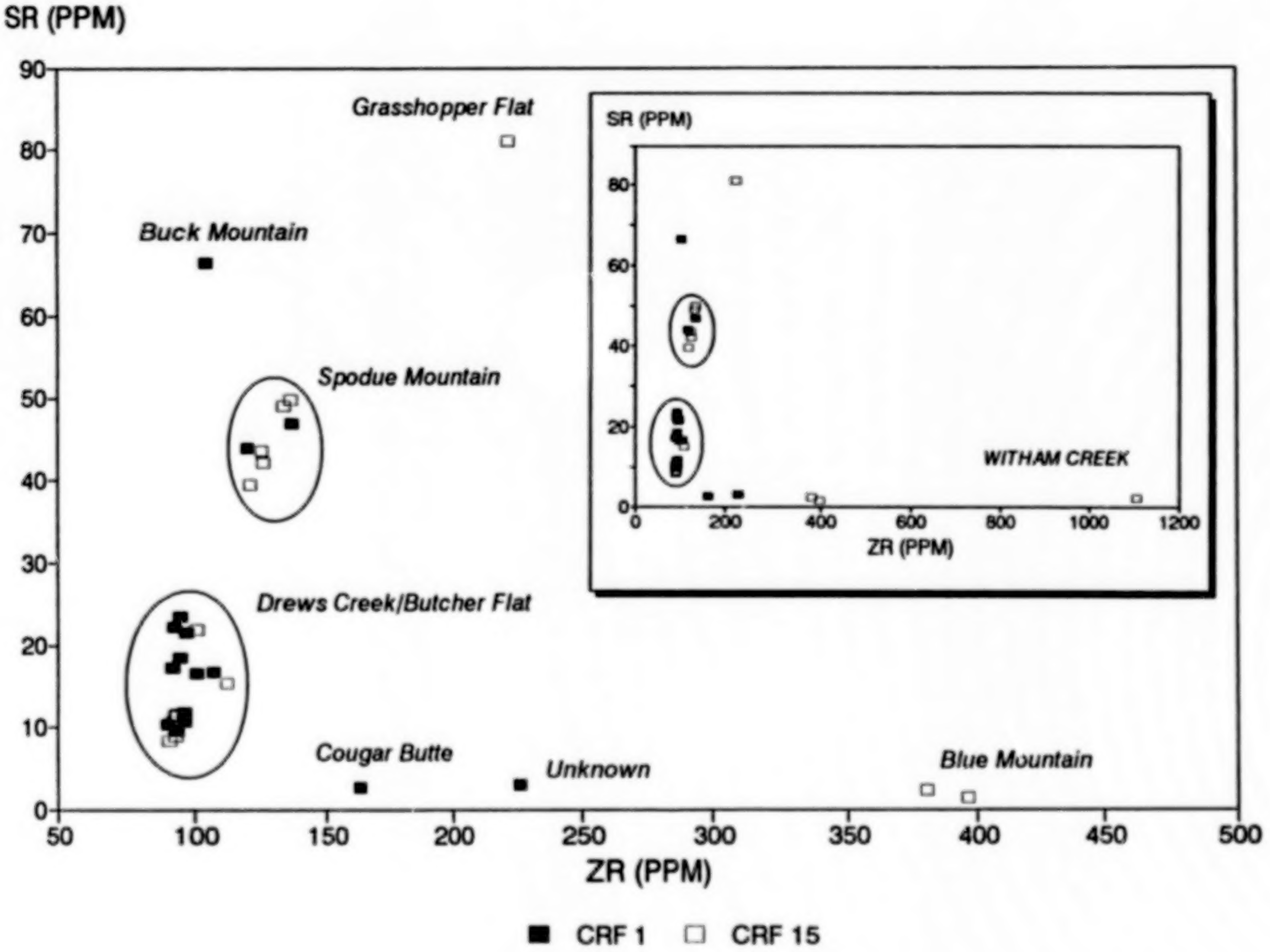


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Figure 43 Intrasite Comparison of Obsidian Sources.

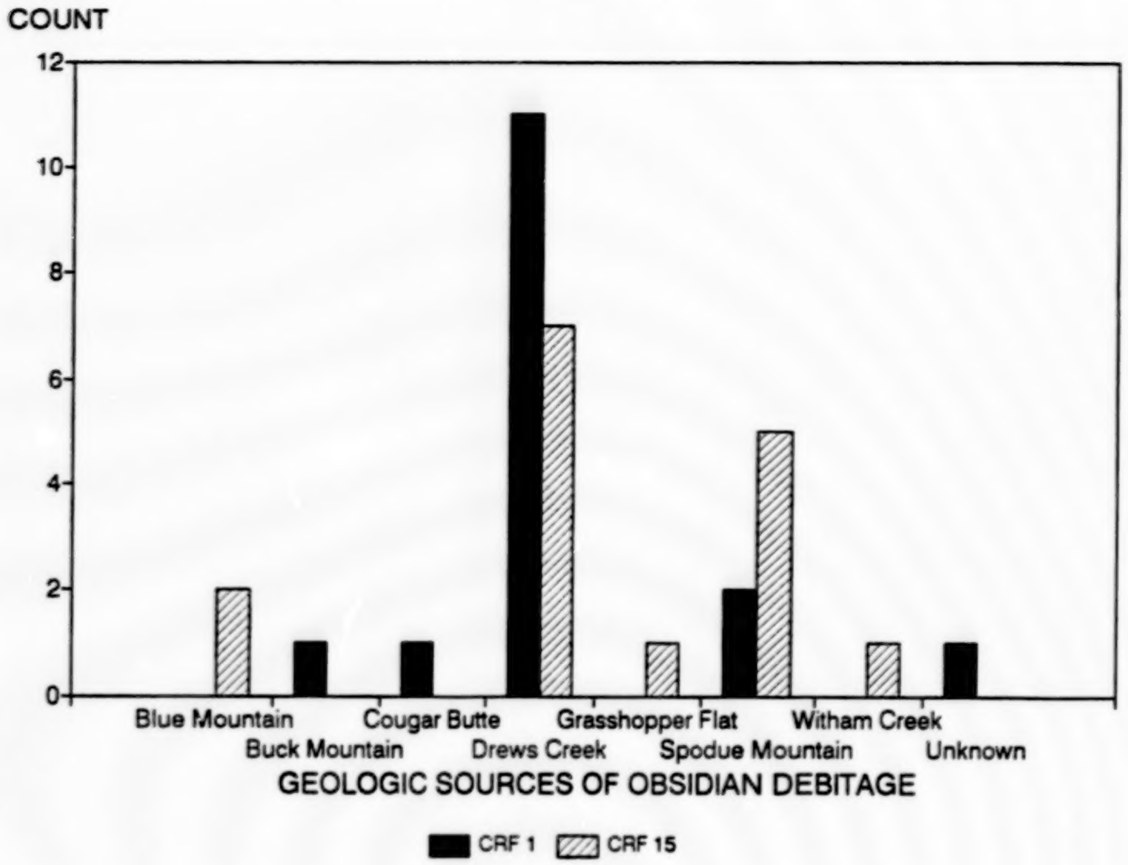


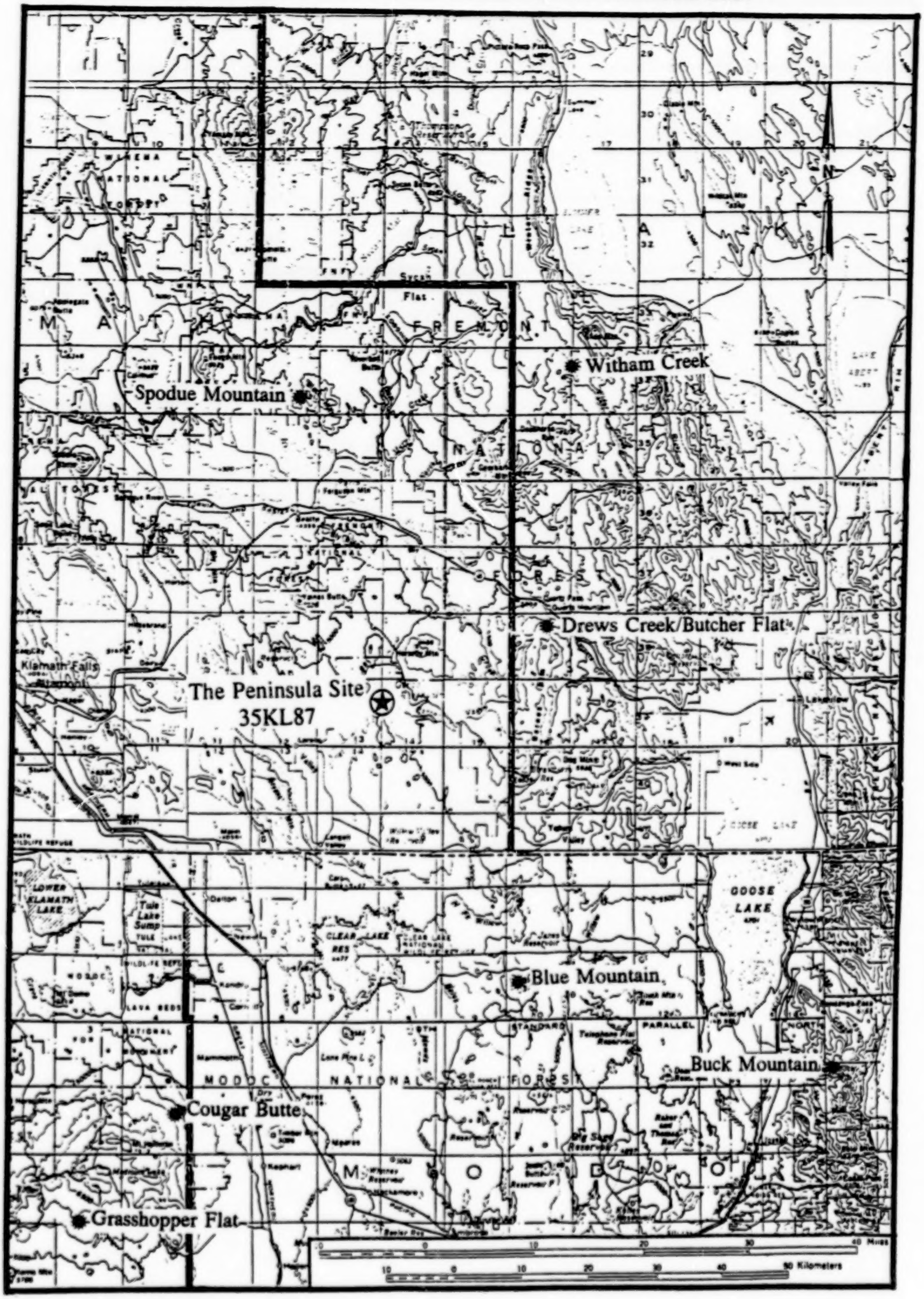
Table 30 Approximate Distance from the Peninsula Site to Obsidian Sources Represented in the Analysed Debitage.

	Distance		
Source	Kilometers	Miles	Direction
Drews Creek/Butcher Flat	27	17	East-northeast
Spodue Mountain	45	28	North-northwest
Blue Mountain	50	31	South-southeast
Witham Creek	56	35	North-northeast
Cougar Butte[1]	61	38	South-southwest
Grasshopper Flat[1]	81	51	South-southwest
Buck Mountain[2]	85	53	Southeast

[1] Cougar Butte and Grasshopper Flat are in the Medicine Lake Highlands.

[2] Buck Mountain is in the Warner Mountains.

Figure 44 Location of Sources of Obsidian Found at the Peninsula Site.



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HYDRATION BANDS

Obsidian hydration analysis revealed a wide range of hydration band thicknesses both within and between sources (Table 31). The thickest band, 17.9 microns from a Grasshopper Flat specimen (9-3-3-3), is thought to be on cortex of natural origin and is not considered further. The thinnest band, 1.5 microns, is from a Blue Mountain specimen (8-3-6-2).

Table 31 Obsidian Hydration Band Analysis Results.

	CRF 1 Band Readings			CRF 15 Band Readings			Total		
Source	N	Range	Mean	N	Range	Mean	N	Range	Mean
Blue Mountain	0	-	-	2	1.5[1]	1.5[1]	1	1.5	1.5
Buck Mountain	1	3.0	3.0	0	-	-	1	3.0	3.0
Cougar Butte	1	3.5	3.5	0	-	-	1	3.5	3.5
Drews Creek/ Butcher Flat	13[2]	3.1–7.1	4.28	5[3]	3.1–7.0	4.22	18	3.1–7.1	4.27
Grasshopper Flat	0	-	-	1[4]	3.3	3.3	1	3.3	3.3
Spodue Mountain	2	2.9–4.4	3.65	5[5]	2.2–5.0[5]	3.36	7	2.2–5.0	3.44
Witham Creek	0	-	-	1	3.2	3.2	1	3.5	3.5
Unknown	1	5.9	5.9	0	-	-	1	5.9	5.9

[1] One Blue Mountain specimen from CRF 15 had no visible band.

[2] Thirteen band readings on 11 specimens.

[3] Five band readings on four specimens; one Drews Creek/Butcher Flat specimen from CRF 15 had no visible band, and for one specimen the diffusion front was vague and the band unreadable.

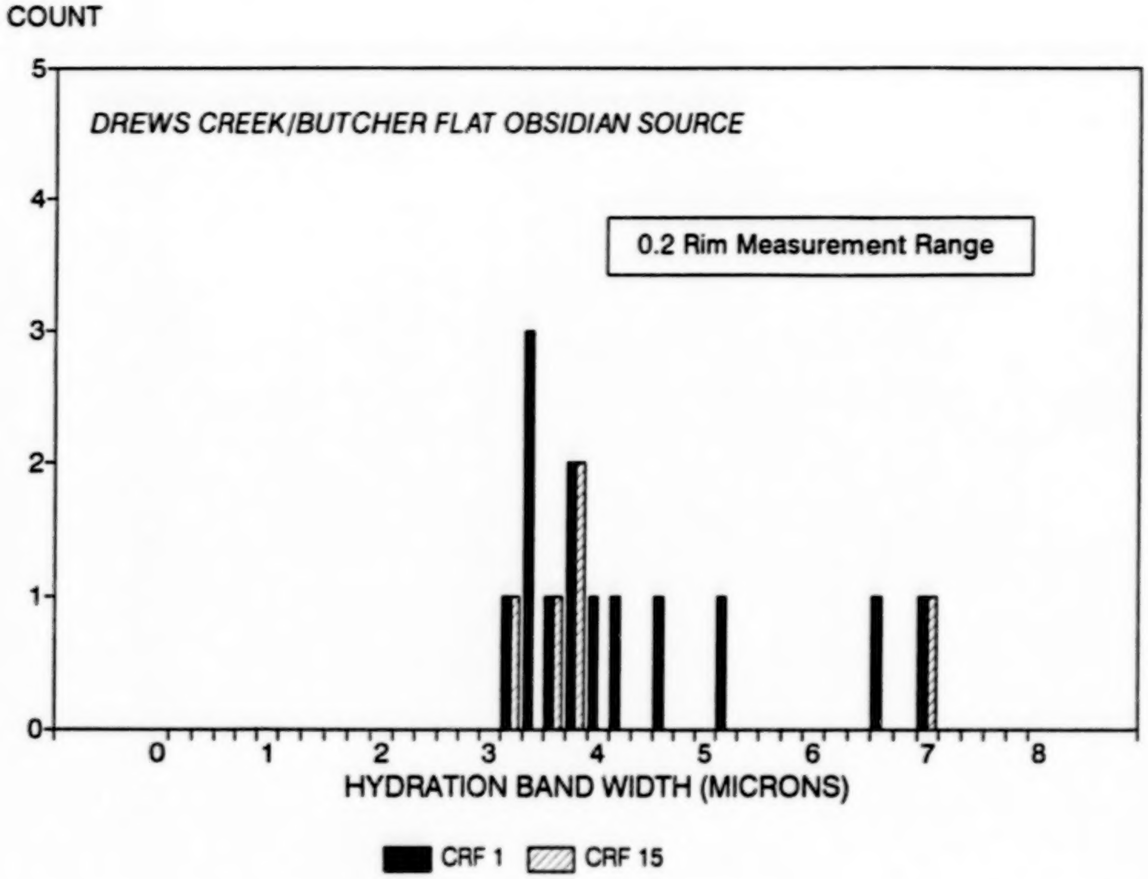
[4] One band reading of 17.9 from the Grasshopper Flat specimen is thought to be cortex of natural origin.

[5] One Spodue Mountain specimen from CRF 15 had no visible band and two readings were taken from another specimen.

Four specimens yielded different band thicknesses on their dorsal and ventral sides: the Grasshopper Flat specimen with 3.3 and 17.9 microns; a Spodue Mountain specimen (9-3-3-4) with 3.5 and 5.0 microns; a Drews Creek/Butcher Flat specimen (1-1-16-1) with 5.2 and 7.1 microns; and another Drews Creek/Butcher Flat specimen (2-1-22-4) with 4.2 and 6.6 microns. That some specimens have more than one band width supports the conclusion from the lithic analysis that the available lithic material was used and reused, worked and reworked, until individual pieces became so small they were discarded.

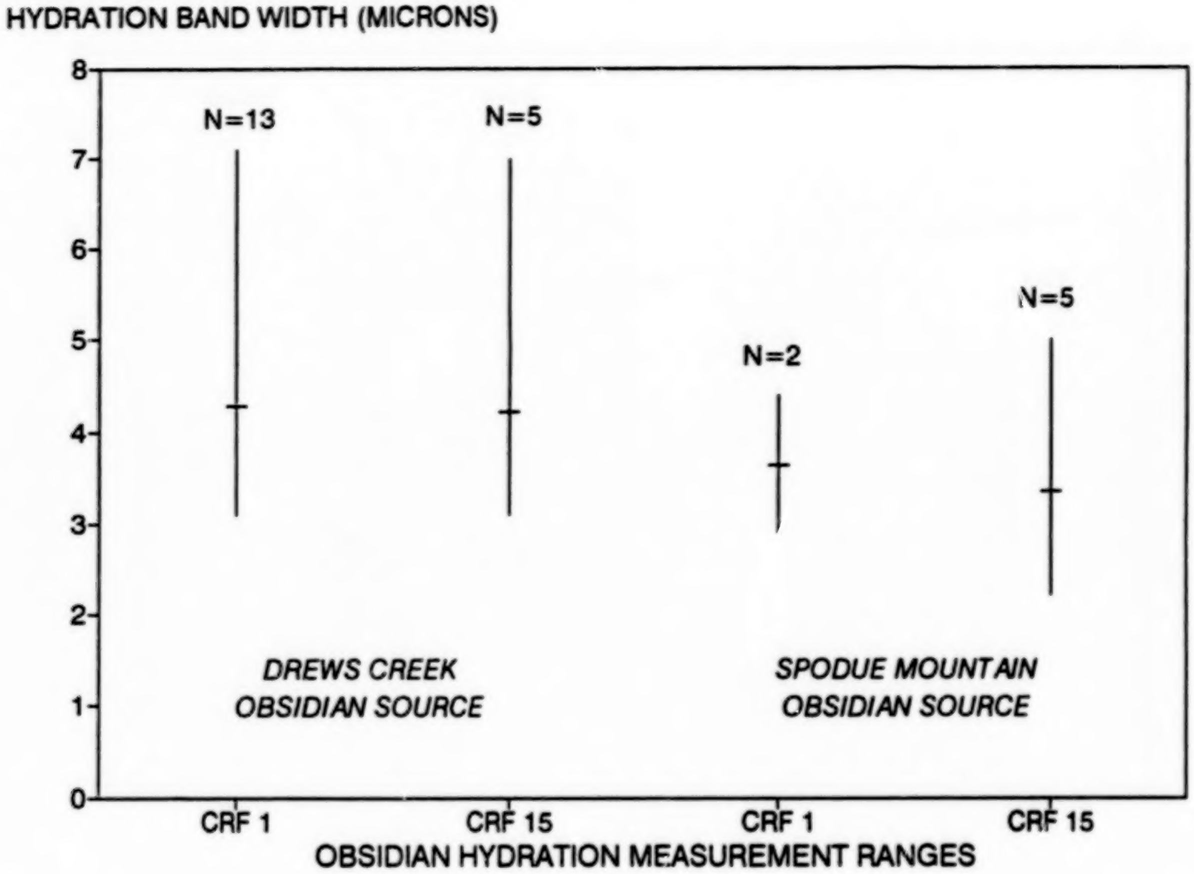
The wide range of hydration band widths, especially from the same source, is suggestive of a lengthy occupational history for the Peninsula Site. The Drews Creek/Butcher Flat readings seem to cluster into two groups, one between 3.1 and 4.5 microns and a second between 6.6 and 7.1 microns (Figure 45). This suggests at least two different occupational episodes at the site. The only reading between these two groups was 5.2 microns. A larger sample size might reveal whether this single measurement is indicative of a third occupational episode. That the later occupation of the site was more intense is indicated by the predominance of Drews Creek/Butcher Flat obsidian hydration bands between 3.1 and 3.9 microns, seventy percent of the measurements. The relative lack of thin band widths might indicate a later abandonment of the site.

Figure 45 Drews Creek/Butcher Flat Obsidian Debitage Hydration Band Widths.



The range of hydration band measurements is similar between the CRF 1 and the CRF 15 debitage of both Drews Creek/Butcher Flat and Spodue Mountain obsidian (Figure 46). The CRF 1 debitage has a slightly thicker mean band width, 4.28 microns compared to 4.22 microns for the CRF 15 Drews Creek/Butcher Flat debitage. This same pattern holds true for debitage of Spodue Mountain obsidian, with the CRF 1 debitage having a mean band width of 3.65 microns and the CRF 15 debitage one of 3.36 microns. This overlap in measurements from the two circular rock features suggests some temporal overlap in use of the northwest and southeast areas of the site. However, the sample size analyzed is too small and is confined to too few circular rock features to draw any firm conclusions as to the extent of this overlap and the duration of any occupational hiatuses in either the northwest or southeast part of the site. The lack of any bands greater than 3.7 and less than 7.0 microns from CRF 15 in the southeast part of the site combined with the presence of CRF 1 (in the northwest part of the site) items with bands in that range tentatively suggests that occupation in the southeast part of the site may have been more discontinuous than in the northwest part.

Figure 46 CRF 1 and CRF 15 Drews Creek/Butcher Flat and Spodue Mountain Obsidian Debitage Hydration Band Measurements.



10. DISCUSSION, SUMMARY, AND INTERPRETATIONS

Although the Peninsula Site, 35KL87, has been seriously disturbed by artifact collectors, the results of limited excavations undertaken at the site demonstrate that it contains important information concerning the prehistory of the Klamath Basin and the northwestern Great Basin. The amount of site area excavated was small, as was the resulting artifact yield. However, analysis of these artifacts and the cultural features present at the site suggests interpretations and issues that can be further addressed by future work at this site and elsewhere in the region.

CHRONOLOGY

Three radiocarbon dates were obtained from charcoal samples taken from excavation units in CRF 21 in the southeast portion of the site during the 1987 field season (Appendix E and Appendix F). One was a modern date of 103.1 ±1.42 years. Two prehistoric dates were obtained: 540 ±90 years ago (A.D. 1410) and 1,080 ±70 years ago (A.D. 870). These dates are comparable to the relative dates obtained by typological comparisons of projectile points with other sites in the region. Most of the projectile points recovered from the site were relatively recent types, including Desert Side-Notched, Cottonwood Triangular, Gunther Barbed, and the Rosegate series (Figure 41). All four of these types have temporal spans beginning 750 to 1,950 years ago (A.D. 1200 to A.D. 1) and lasting into the Historic Period.

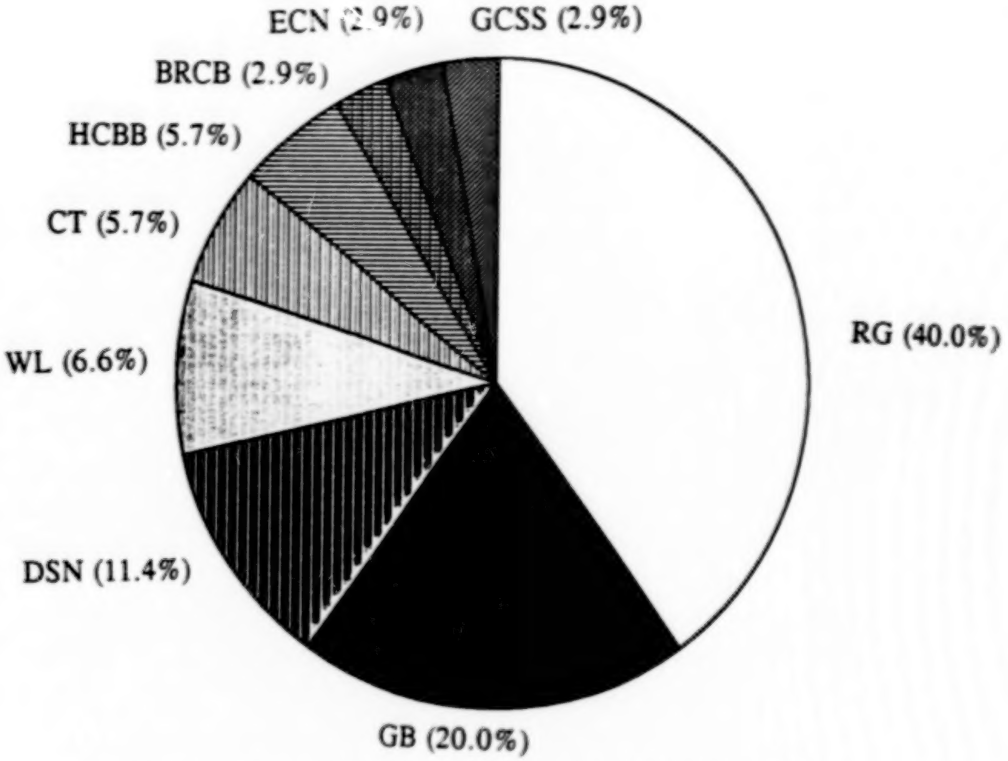
Other points recovered from the site are of types that have been assigned to slightly older time periods. The Gunther Barbed sub-type recovered was seen by Sampson (1985:342, 347) as being a useful time marker for Nightfire Island with a terminal date of about 1,450 B.P. (A.D. 500). This falls within the earlier portion of the temporal range of the more recent points.

One Elko series point, with a temporal range of 3,950-950 B.P. (2,000 B.C.-A.D. 1000) was recovered from the surface in the southeast portion of the site.

Older point types recovered include Gatecliff Split Stem with a temporal range of 5,000-2,500 B.P. and Humboldt Concave Base types with a range, although controversial, of 6,000-3,000 B.P. It is interesting to note that subsurface specimens of these two types were recovered from an excavation unit located in the northwest part of the site while subsurface specimens of the more recent types were recovered from excavation units in the southeast part of the site.

Two additional point types were also represented: a Willow Leaf type most likely dating between 8,500 B.P. and historic times and a Black Rock concave base type dating between 11,000-7,000 B.P. Two of the three Willow Leaf type points recovered were subsurface specimens, while the Black Rock concave base specimen was a surface find.

Figure 47 Proportional Representation of Projectile Point Types of Varying Ages Recovered from the Peninsula Site, 35KL87.



DSN: Desert Side-Notched (A.D. 1200–1850; 800 B.P.–historic)
CT: Cottonwood Triangular (A.D. 900–1850; 1,100 B.P.–historic)
RG: Rosegate series (A.D. 1–1850; 2,000 B.P.– historic)
GB: Gunther Barbed (600 B.C.–A.D. 1850; 2,600 B.P.–historic)
ECN: Elko Corner-notched (2,000 B.C.–A.D. 1000; 4,000–1,000 B.P.)
GCSS: Gatecliff Split Stem (3,000–500 B.C.; 5,000–2,500 B.P.)
HCBB: Humboldt Concave Base Type B (4,000 - 1,000 B.C.; 6,000–3,000 B.P.)
WL: Willow Leaf (6,500 B.C.–A.D. 1850; 8,500 B.P.–historic)
BRCB: Black Rock Concave Base (9,000–5,000 B.C.; 11,000–7,000 B.P.)

The recovery of unburnt post fragments and a dried but uncharred camas bulb, in addition to the recent point types, from an excavation unit placed in CRF 15 is highly supportive of the proposition that the site was used fairly recently.

The circular rock features at the site are similar to those found at Lake Abert to the northeast. It is interesting to note that the northwest cluster of circular rock features at the Peninsula Site had a fairly wide range of sizes, as did the circular features found on the older terraces of Lake Abert (Connolly and Pettigrew 1985:85–90). By contrast, the southeast cluster of circular rock features at the Peninsula Site had more homogenous sizes, as did the circular features found on the younger terraces of Lake Abert. The temporal ranges of the projectile point types recovered from excavation units in the circular rock features also support the view than the northwest circular rock feature cluster may be older than the southeast circular rock feature cluster. However, the obsidian hydration analysis indicates some overlap in occupation between the northwest and southeast circular rock feature clusters with the possibility that occupational discontinuities between the site's earliest and latest occupations were greater in the southeast part of the site than in the northwest.

Obsidian hydration analyses suggest an occupational history of a somewhat lengthy duration and a site antiquity greater than the oldest radiocarbon date of 1,080 ±70 years ago (A.D. 870) from CRF 21. This analysis also suggests two and possibly three occupational episodes for the site, with a more intensive occupation during the site's later years than during its earlier ones. This more intensive occupation is also reflected in the predominance of relatively recent point types recovered from the site. However, the paucity of hydration band thickness of less than 2.7 microns on the obsidian debitage would suggest this more intensive occupation occurred somewhat earlier than the temporal spans assigned to the recent projectile points types.

The three possible occupational episodes evidenced by obsidian hydration data are also somewhat paralleled by the temporal associations of the recovered projectile points. Hughes (1986:120) holds that evidence from stratified archaeological sites indicates most "projectile point types possess time spans of comparatively 'short' duration" that do not overlap. Based on the temporal durations Hughes (1986:102) indicates for points recovered from Nightfire Island, Kawumkan Springs, and Surprise Valley, the point types recovered from the Peninsula Site follow a sequence beginning with the Gatecliff Series, followed by the Elko Series, then the Gunther and Rosegate Series, and ending with the Desert Side-notched and Cottonwood Triangular types. This sequence is also similar to that recently proposed for the Lake Abert/Chewaucan Marsh area by Oetting (1990) with a Middle Archaic I phase (4,000–3,000 B.P.) characterized by the Gatecliff and Elko series, a Middle Archaic II phase (3,000–2,000 B.P.) characterized by Elko series alone, a Late Archaic I phase (2,000–1,000 B.P.) dominated by roughly equal numbers of Elko and Rosegate series points, and a Late Archaic II phase (1,000 B.P.–historic contact) dominated by Rosegate points with a small amount of Desert Side-Notched and Cottonwood Triangular types. Obsidian hydration analysis of the recovered obsidian projectile points should indicate whether some variation of these hypothesized temporal sequences is valid for the Peninsula Site. It may also explain the apparent discrepency between the abundance of relatively recent point types found and the paucity of thin hydration bands on the obsidian debitage.

SUBSISTENCE

Faunal and floral remains recovered from the Peninsula Site were sparse: a few bone fragments, some juniper berries, an unidentified seed, a camas bulb, and a mussel shell. The evidence of artifacts and cultural features, however, and the biotic setting of the site itself, provides some strong clues about the nature of the subsistence activities that took place.

The presence of numerous boulder and bedrock grinding features strongly indicates that the processing of plant foods was a major activity at the site. This processing probably involved the pulverizing or mashing of seeds and roots to be dried and stored for winter use. Although no caches were some may exist along the site's steep northeast-facing slope leading down to Gerber Reservoir.

A hypothetical reconstruction of the site's prehistoric environment indicates that marsh, dry meadow, sagebrush flat, and ponderosa pine forest communities existed within a kilometer of the site (Figure 3). Thus nearly all the floral and faunal resources known to have been used by the ethnographic Modoc (described earlier in this report) were easily accessible.

Assigning a Modoc affiliation to the site is supported by the available ethnographic evidence concerning the territory of these people (Figure 4). The Peninsula Site lies well within the historic Modoc range. Further, the boundaries of the ethnographic Modoc are closely paralleled by the location of obsidian procurement areas as demonstrated by x-ray fluorescence analysis (Figure 44). Analysis of the basalt (non-glassy igneous) cobble or cobble-flake tools also shows more similarities with the characteristics that Trygg (1971) found associated with the Modoc than those she found associated with the neighboring Northern Paiute, although some tools found at the Peninsula Site had Northern Paiute characteristics. In addition, 20 percent (7 of 35) of the projectile points recovered are either Desert Side-Notched or Cottonwood Triangular types, which are generally associated with the Northern Paiute. These factors suggest the possible presence of Northern Paiute peoples at the site during its later occupation, although this hypothesized presence probably reflects joint use through intermarriage and coalescing of peoples after their decimation by Euroamerican disease rather than population replacement. Indeed, Stern (1966:17, 84) notes that shortly after the establishment of the Klamath Reservation, the Upland Klamath tribelet, the Yahuskin (Summer Lake/Silver Lake) band of Northern Paiute, and the Modoc who did not follow Captain Jack to war settled together around Yainax, just a short distance north-northwest of the Peninsula Site. This suggests that inter-group ties may have existed among these peoples prior to historic contact.

The presence of tools that apparently were used in the manufacture of mortars and metates is an apparently unique feature of the Peninsula Site. These tools probably have been found at other sites and have simply been misinterpreted. A larger sample of tools is needed to refine the typology and conclusions developed from the tool analysis of the Peninsula Site.

Use of animal resources is indicated not only by the bone fragments recovered, but also by the presence of projectile points and mano-like tools that have been used to process animal hides. The presence of these latter tools also suggests that animal hides were processed at the site. In addition to small and large land mammals, mussels, shells, and waterfowl were probably procured from the creeks and marshy areas.

The wide diversity of small flake tools is also suggestive of butchering and the working of hide and bone, in that these tools could have been used for cutting, slicing, scraping, drilling, punching, and incising. A more detailed functional analysis of these tools, as well as the procurement of a larger sample, might provide a fuller picture.

The obsidian data indicates that although the closest sources to the site, Drews Creek/Butcher Flat and Spodue Mountain, predominated, a wide range of other, more distant sources to the east and south were also visited. The differences in sources represented in the sample analyzed from CRF 1 and CRF 15 are striking and not easily explained. Among the possibilities are that they represent different patterns of summer procurement trips among different families; different kin and trading ties among different families; or different seasonal-specific procurement and use patterns, with the more diverse CRF 15 sources representing summer procurement and or use and the close, predominant CRF 1 Drews Creek/Butcher Flat source representing winter procurement and or use.

CIRCULAR ROCK FEATURES

The relatively large number of circular rock features at the Peninsula Site raises questions about their potential significance. Artifacts recovered from excavation units in two of these features and the presence of bedrock mortars and hopper mortar bases in many of them would seem to indicate that at least some of these features were habitation structures.

The size range of these circular rock features compares closely with the range for those found at Lake Abert and interpreted as the remains of house structures (Pettigrew 1985:185). A critical question concerning these features at the Peninsula Site is whether they represent summer or winter habitation structures.

Analysis of the circular rock features indicates that the measurements of the group found in the southeast part of the site are significantly statistically different from that of the group found in the northwest part. The size range of the southeast cluster is more homogenous. The mean diameters of these features range from 3.45 to 5.50 m, with two-thirds of them being between 3.84 and 4.85 meters. In contrast, the sizes of circular rock features in the northwest cluster are more variable with mean diameters ranging from 2.13 to 8.73 meters. Only one-ninth of these are between 3.84 and 4.85 meters.

In addition to these differences in diameters, the circular rock features in the northwest cluster seem to have higher walls than those in the southeast cluster, although the available data were not sufficient to test statistically. Some of the circular rock features in the northwest cluster also share common walls. None of those in the southeast cluster do. These differences are strikingly similar to differences observed for the circular features found on the older and younger terraces of Lake Abert. Connolly and Pettigrew (1985:89) hypothesized that the different sizes of circular features found on the older terraces represented "structures that were functionally or socially distinct (e.g, houses, storage facilities, sweat lodges or menstrual lodges, communal structures, chief's houses, etc.). . .

.[and that] the settlement at Lake Abert may indicate a larger proportion of such specialized functions at an early period, and that this proportion decreased through time."

Connolly and Pettigrew (1985:89) suggest a social-organizational explanation for the pattern they observed, with the structures on the older terraces representing a permanent village, occupied year-round, "in an environment that provides a constant supply of food, or a seasonal abundance that might be stored." In contrast, the structures on the younger terrace might represent a "seasonal occupation" by a people with a "lifeway of seasonal transhumance."

The age and size similarities between the northwest cluster of circular rock features at the Peninsula Site and the circular features on the older terraces of Lake Abert, as well as between the southeast cluster of circular rock features at the Peninsula Site and the circular features found on the lower terrace of Lake Abert, suggest that a similar hypothetical explanation may be appropriate for the Peninsula Site.

Pettigrew (1985:185) conclude that the circular rock features at Lake Abert were "far sturdier than would be needed for summertime activities." A similar conclusion seems appropriate for some of the northwest cluster of circular rock features at the Peninsula Site. The circular rock features in the southeast cluster, on the other hand, could possibly be summer habitation structures. In addition to the size differences noted, the southeast cluster features are generally in locations with greater vegetative cover, which could have provided protection from the heat of the summer sun. By contrast, the features in the northwest cluster are in more open areas and would have more of a southern exposure to what warmth the winter sun might have brought.

Interpreting the northwest cluster of circular rock features as winter habitation structures is also supported by the available ethnographic evidence and archaeological work elsewhere as summarized earlier in this report. Both Ray (1963:146) and Powers (1877:255) indicate that the semi-subterranean earth lodge may be relatively recent among the Modoc, having supplanted the dome-shaped, mat-covered hut for winter use. Sampson (1985:440) interprets the archaeological evidence at Nightfire Island as indicating that the "ancestral form" of the ethnographically known Modoc winter semi-subterranean earth lodge incorporated features of both the typical ethnographic summer shelter and the winter mat-covered house and pit house.

Connolly and Pettigrew (1985:86) also suggest that circular rock habitation structures may have been used in the Lake Abert area due to the difficulty of digging a pit for a semi-subterranean earth lodge in the relatively shallow soil found on the upper lake terraces. Moratto (1984:439) also indicates that rock walls were used in the construction of earth lodges in northeastern California "where digging was difficult." Digging would certainly have been difficult in the stone soils of the Peninsula Site, with bedrock and large boulders often at or near the surface.

In addition, Ray (1963:209) identifies three Modoc winter villages located at elevations comparable to that of the Peninsula Site. This would mean that the high elevation of the Peninsula Site would not preclude interpreting the site, or a portion of it, as a winter village. Indeed, the environmental setting of the Peninsula Site is similar to that of Ray's three winter villages. Like them, the Peninsula Site is located in an area of relatively rich, dense, and easily accessible subsistence resources. These sites also have easy access to higher elevation forested areas (Figure 6).

Another factor to consider, discussed in the archaeological background presented earlier in this report, is the possible location of a crematory site 10.0 km (6.25 mi) northwest of the Peninsula Site at Painter Spring (Silvermoon 1985:131). Ethnographically such sites were usually located in proximity to winter villages.

Recent research in the uplands east of Silver Lake at the edge of the northwestern Great Basin has identified the presence of a large village site with 122 boulder-ringed structures, indicative of what Jenkins and Brashear (1993:50–51) suggest was a two-village settlement-subsistence system similar to that practiced by the ethnographic Klamath: upland spring and summer villages associated with intensive root crop exploitation, and lowland winter villages located in proximity to water, timber, and upland food caches. Jenkins (1993:18) notes that "during years of high root productivity it may have been logistically more efficient to bring lowland resources to the uplands" and winter there, "than to move massive quantities of roots" to villages in the lowlands. Jenkins (personal communication, 1993) says floral and faunal evidence indicates that a few of the upland village boulder-ringed structures appeared to have been occupied during the winter months. This situation is somewhat similar to the interpretation of the northwest circular rock feature cluster at the Peninsula site as winter habitation structures. The Peninsula Site is also in a location not only associated with root crop exploitation but is also close to water and timber. Undiscovered caches may be near the Peninsula Site as no systematic effort was made during site testing to identify possible caches on the site's steep northeast-facing slope leading down to Gerber Reservoir.

In any event, the wide variety of tools, the relatively large number of habitation structures, and a preliminary analysis of subsistence resources accessible from the Peninsula Site suggest that a high degree of sedentism was characteristic of the prehistoric inhabitants.

ROCK ART

Another similarity with the Lake Abert sites is found in the association of rock art with a habitation site. The petroglyphs found at the Peninsula Site, like many of those at the Lake Abert sites, are of Great Basin Curvilinear Abstract Style. Also found at the Peninsula Site is some pit and groove rock art.

Pettigrew (1985:186) notes that "rock art is most often analyzed independently of other cultural manifestations, probably because in most places in the West it has been found in isolated contexts." As at the Lake Abert sites, the association of rock art at the Peninsula Site with habitation structures offers an opportunity to address temporal, functional, and ideographic questions.

Particularly striking about the rock art at the Peninsula Site is its association with boulder and bedrock grinding features. A number of these features are located in a roughly circular distribution around and within a few meters of the rock art (Figure 10). This co-occurrence is highly suggestive of an association between the rock art and the activities of women, assuming by ethnographic analogy that the grinding and pulverizing activities indicated by the grinding features were carried out by women.

When analyzed in the context of a wider study, it may be possible to associate particular rock art motifs with particular activities or persons of a particular sex. In addition, given that the great bulk of the artifact evidence and the radiocarbon dates place the Peninsula Site at least within the last thousand or so years, it may be that the rock art motifs at the Peninsula Site date to the same time period.

CULTURAL CHANGE AND THEORETICAL ISSUES

Present evidence suggests that virtually all of the occupation in both areas of the Peninsula Site falls within the last 4,000 to 5,000 years and that the site's circular rock features are the remains of habitation structures, some of which were used as winter dwellings. Occupation appears to have been discontinuous, with perhaps three occupational episodes. In addition to spring, summer, and fall occupations, portions of the site may have been used intermittently as a winter village throughout much of its history. Sometime between 2,000 and 1,000 B.P. use of the site intensified, especially during the summer, possibly in response to changes in the availability and of lowland and upland resources. In addition, a growing local population may also have been augmented by a displaced northwestern Great Basin ancestral Klamath-Modoc population moving into the area sometime after 1,000 B.P. Occupation of the site may have continued to just before historic contact, although use during the winter may have decreased in its later years. This interpretation should be viewed as a hypothesis subject to further testing.

This interpretation also parallels the broader regional picture developed by Aikens (1985:525), with a second occupation of the northwestern Great Basin by lake-marsh cultures sometime after 4,950 B.P. and an eventual pullback about 1,100 B.P. to the Klamath Basin and higher elevation areas in the mountains. This pullback is seen as the ultimate response to environmental change that diminished the lake-marsh resources of the northwestern Great Basin. These lake-marsh adapted cultures were then replaced by the more desert-adapted Numic people.

This hypothesized shift in its role within a broader gographic-cultural interaction zone may provide a stronger explanatory framework than simply an environmental one for the apparent shift in use of the Peninsula Site, with the site and its location decreasing in importance. If the differences in the circular rock features of the northwest and southeast clusters reflect changes in social-organizational complexity, the decrease in the site's year-round importance relative to the territory inhabited by the ancestral Klamath-Modoc might also help explain that change in social-organizational complexity. Elements of central place theory or location theory may be applicable here. Further work at the Peninsula Site and surrounding areas may shed light on the relative importance of, and interplay between, environmental and socioeconomic variables in explaining cultural change.

Alternative hypotheses might also be supported by the data from the Peninsula Site, although not as strongly as the one outlined above. These hypotheses differ on the season of use and time period assigned to the northwest and southeast parts of the site.

It is possible that there are temporal differences between the two areas of the site but with summer being the season of use throughout its occupational history. Differences in circular rock feature sizes might then be interpreted as reflecting differences in social-organizational complexity over time. Under this scenario the earlier-occupied northwest circular rock features may be indicative of greater wealth and status differences among people than the later-occupied southeast circular rock features suggest. Alternatively they could be indicative of an adaptive strategy that required extended families to stay together throughout the year rather than disaggregate during the summer, as would be suggested by the southeast circular rock features.

It is also possible that the two parts of the site exhibit neither temporal nor seasonal differences and that both were seasonally occupied during the summer over the site's history. With this hypothesis the differences in circular rock feature sizes might be interpreted as reflections of the degree of social-organizational complexity of the people occupying the site with people living in the larger circular rock features having a higher status and more wealth than those people living the smaller circular rock features.

All three hypotheses can be tested by additional work at the Peninsula Site, particularly in the northwest part. Recovery of larger and more representative samples of artifacts and floral and faunal material from both parts of the site and the discovery of caches might help address the season of use question. To this end the site's steep northeast-facing slope leading down to Gerber Reservoir should be examined for possible caches and additional circular rock features should be excavated. The subsequent recovery of additional material suitable for radiocarbon dating and obsidian hydration and x-ray fluorescence analyses, as well as the recovery of a larger sample of projectile points from the northwest part of the site, would help address the time-of-use question. Despite their disturbance, additional excavations in the circular rock features in the northwest part of the site seem warranted to address either question. Even if the cultural deposits have been disturbed, the material present within or near any one particular circular rock feature was probably not transported from a different area of the site. Relatively valid inferences could probably still be drawn from the material recovered from these deposits.

Evidence concerning these hypotheses could also be obtained from a wider study of the surrounding area. Knowing the range of temporal and seasonal/functional differences among other sites in the region should shed light on the temporal and seasonal dimensions of the Peninsula Site.

At this point in the archaeological research of the Gerber Reservoir area, however, the hypothesis which best fits the evidence is that the site was both a winter and summer village between 4,000 and 1,000 B.P. and that sometime between 2,000 and 1,000 B.P. use of the site as a summer village intensified. Occupation of the site appears to have continued to just before historic contact, although use during the winter may have decreased in its later years. With this hypothesis, the site's intensification of summer use and possible decrease in winter use are related to environmental change, an increased dependence on upland resources, an increased local population, a possible movement of a displaced northwestern Great Basin ancestral Klamath-Modoc population into the area, and shift in the site's role within a broader geographic-cultural interaction zone as Penutian speaking peoples abandoned the northwestern Great Basin and its greatly diminished lake-marsh resources.

REFERENCES

Aikens, C. Melvin

1978a The Far West. In *Ancient Native Americans*, Jesse D. Jennings, ed. San Francisco: W. H. Freeman and Company. Pp 131–158.

1978b Archaeology of the Great Basin. *Annual Review of Anthropology* 7:71–87.

1982 Archaeology of the Northern Great Basin: An Overview. In Man and Environment in the Great Basin, David B. Madsen and James F. O'Connell, eds. *Society for American Archaeology Special Papers* 2:139–155. Washington D.C.

1985 The Nightfire Island Lakeshore Adaptation in the Broader Context of Desert West Prehistory. In Nightfire Island: Later Holocene Lake-marsh Adaptation on the Western Edge of the Great Basin, C. Garth Sampson. *University of Oregon Anthropological Papers* 33. Eugene. Pp 519–528.

Aikens, C. Melvin, and Rick Minor

1978 Obsidian Hydration Dates for Klamath Prehistory. *Tebiwa* 11:1–15.

Aikens, C. Melvin, and Y. T. Witherspoon

1986 Great Basin Numic Prehistory: Linguistics, Archaeology, and Environment. In Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings, C. K. Condie and D. D. Fowler, eds. *University of Utah Anthropological Papers* 110:7-20).

Allison, Ira S.

1979 Pluvial Fort Rock Lake, Lake County, Oregon. *Oregon Department of Geology and Mineral Industries Special Paper* 7.

1982 *Geology of Pluvial Lake Chewaucan, Lake County, Oregon*. Corvallis: Oregon State University Press.

Antevs, Ernst

1948 Climatic Change and Pre-White Man. In The Great Basin, with Emphasis on Glacial and Post-Glacial Times. *Bulletin of the University of Utah* 30(20):167-191.

1955 Geologic-Climatic Dating in the West. *American Antiquity* 20(4:1):317–335.

Aschmann, Homer
1958 Great Basin Climates in Relation to Human Occupance. *University of California Archaeological Survey Report* 42:23-40. Berkeley.

Bailey, Vernon
1936 *The Mammals and Life Zones of Oregon*. Washington D.C.: U.S. Government Printing Office.

Baldwin, Ewart M.
1981 *Geology of Oregon*. Dubuque: Kelly/Hunt Publishing Company.

Baumhoff, Martin A., and Robert F. Heizer
1965 Postglacial Climate and Archaeology in the Desert West. In *The Quaternary of the United States*, H. E. Wright, Jr. and David G. Frey, eds. Princeton: Princeton University Press. Pp 697-707.

Baxter, Paul W., and Richard M. Pettigrew
1985 Rock Art. In Archaeological Investigations on the East Shore of Lake Abert, Lake County, Oregon, Volume 1, Richard M. Pettigrew. *University of Oregon Anthropological Papers* 32. Eugene. Pp 155-169.

Bedwell, Stephen F.
1973 *Fort* Rock Basin: Prehistory and Environment. Eugene: University of Oregon Books.

Bentley, Elton B.
1974 The Glacial Geology of Eastern Oregon Uplands. Ph.D. Dissertation, Department of Geography, University of Oregon. Eugene.

Bettinger, Robert L.
1978 Alternative Adaptive Strategies in the Prehistoric Great Basin. *Journal of Anthropological Research* 34:27-46.

Blackwelder, Elliot
1931 Pleistocene Glaciation in the Sierra Nevada and Basin Ranges. *Bulletin of the Geological Society of America* 42:865-922.

Bryan, Alan L., and Ruth Gruhn
1964 Problems Relating to the Neothermal Climatic Sequence. *American Antiquity* 29(3):307-315.

Burnside, Carla D.
1987 Interim Report, Archaeological Survey and Excavations in the Gerber Reservoir Quadrangle, Summer 1987. University of Oregon Department of Anthropology. Eugene.

Cannon, William J.
1984 Cultural Resource Survey of Gerber Reservoir (draft). USDI Bureau of Land Management Lakeview District Office, Lost River Planning Unit, Lost River Resource Area.

Carver, G. A.
1972 Glacial Geology of the Mountain Lakes Wilderness and adjacent parts of the Cascade Range, Oregon. Ph.D. Dissertation, Department of Geological Sciences, University of Washington, Seattle.

Chesterman, C. W.
1955 Age of the obsidian flow at Glass Mountain, Siskiyou County, California. *American Journal of Science* 253:418–424.

Connolly, Thomas J., and Richard M. Pettigrew
1985 Circular Features. In Archaeological Investigations on the East Shore of Lake Abert, Lake County, Oregon, Volume 1, Richard M. Pettigrew. *University of Oregon Anthropological Papers* 32. Eugene. Pp 85–100.

Crandall, Dwight R.
1965 The Glacial History of Western Washington and Oregon. In *The Quaternary of the United States*, H. E. Wright, Jr. and David G. Frey, eds. Princeton: Princeton University Press. Pp 341–353.

Cressman, Luther S.
1956 Klamath Prehistory. *Transactions of the American Philosophical Society* 46(4). Philadelphia.

Cressman, Luther S., Howell Williams, and Alex D. Krieger
1940 Early Man in Oregon: Archaeological Studies in the Northern Great Basin. *University* of Oregon Monographs, Studies in Anthropology 3. Eugene.

Davis, Emma Lou
1963 The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance. American Antiquity 29(2):202–212.

152

Davis, Jonathan O.
1982 Bits and Pieces: The Last 35,000 Years in the Lahontan Area. In Man and Environment in the Great Basin, David B. Madsen and James F. O'Connell, eds. *Society for American* Archaeology Special Papers 2:53–75. Washington D.C.

Detling, Leroy E.
1968 Historical Background of the Flora of the Pacific Northwest. *University of Oregon Museum of Natural History Bulletin* 13. Eugene.

Dicken, Samuel N., and Emily F. Dicken
1985 *The Legacy of Ancient Lake Modoc: A Historical Geography of the Klamath Lakes Basin*. [Eugene, Oregon? S. N. Dicken, distributed by University of Oregon Bookstore; Klamath Falls distributed by Shaw Stationary Company]

Dornath, Fred Arthur
1958 Basin-Range Structure of South-Central Oregon. Ph.D. Dissertation, Department of Geology, University of Oregon. Eugene.

Fowler, Don D., and Jesse D. Jennings
1982 Great Basin Archaeology: A Historical Overview. In Man and Environment in the Great Basin, David B. Madsen and James F. O'Connell, eds. *Society for American* Archaeology Special Papers 2:105–120. Washington D.C.

Franklin, Jerry F., and C. T. Dyrness
1973 *Natural Vegetation of Oregon and Washington*. Oregon State University Press. Corvallis.

Gehr, Elliot
1985 Section 4.D: Report on Historical and Archaeological Resources, Application for License, Salt Caves Hydroelectric Project. Submitted to the Federal Energy Regulatory Commission by the City of Klamath Falls, Oregon.

1986 Congruence of Ethnohistoric anmd Archaeological Settlement Models in the Klamath River Canyon: The Eastern Shasta and the Lost Klamath Village of Laik'elmi. Paper presented at the Second Annual California Indian Conference, University of California, Berkeley.

Grayson, Donald K.
1973 The Avian and Mammalian Remains from Nightfire Island. Ph.D. Dissertation, Department of Anthropology, University of Oregon. Eugene.

1976 The Nightfire Island Avifauna and the Altithermal. In Holocene Environmental Change in the Great Basin, Robert Elston, ed. *Nevada Archaeological Survey Research Paper* 8. Reno.

1982 Toward a History of Great Basin Mammals During the Past 15,000 Years. In Man and Environment in the Great Basin, David B. Madsen and James F. O'Connell, eds. *Society for American* Archaeology Special Papers 2:82–101. Washington D.C.

Hansen, Henry P.
1942 Postglacial Forest Succession, Climate, and Chronology in the Pacific Northwest. *Transactions of the American Philosophical Society* 37. Philadelphia.

1947 Postglacial Forest Succession, Climate, and Chronology in the Pacific Northwest. *Transactions of the American Philosophical Society* 37. Philadelphia.

Hardesty, Donald L., and Steven Fox
1974 Archaeological Investigations in Northern California. *Nevada Archaeological Survey Research Paper* 4. Reno.

Hayden, Brian, and Margaret Nelson
1981 The Use of Chipped Lithic Material in the Contemporary Maya Highlands. *American Antiquity* 46(4):885–900.

Heizer, Robert F., and Martin A. Baumhoff
1962 *Prehistoric Rock Art of Nevada and Eastern California*. Berkeley: University of California Press.

Heizer, Robert F., and C. W. Clewlow, Jr.
1973 *Prehistoric Rock Art of California, Volume 1 - Text and Plates*. Ramona, California: Ballena Press.

Hopkins, William E.
1979 *Plant Associations of the Fremont National Forest*. USDA Forest Service, Pacific Northwest Region, R6-ECOL-79-094. Portland

Hughes, Richard E.
1977 The Archaeology of the Burrell Site (CA-Mod-293), A Lowland Occupation Site in the Goose Lake Basin, Northeast California. Final Report for the National Endowment for the Humanities AY-7287-72-379, the Goose Lake Basin Archaeological Project.

1986 *Diachronic Variability in Obsidian Procurement Patterns in Northeastern California and Southcentral Oregon. University of California Publications in Anthropology 17. Berkeley.*

Jenkins, Dennis L.
1993 Settlement-Subsistence Patterns in the Fort Rock Basin: a Cultural-Ecological Perspective on Human Responses to Fluctuating Wetlands Resources of the Last 5000 Years. Draft manuscript in possession of the author.

Jenkins, Dennis L. and Ann Brashear
1993 Excavations at Four Habitation Sites in the Bouldewr Village Uplands: a Preliminary Report. Draft manuscript in possession of the author.

Jennings, Jesse D.
1957 Danger Cave. *University of Utah Anthropological Papers* 27. Salt Lake City, Utah.

1978 Origins. In *Ancient Native Americans*, Jesse D. Jennings, ed. San Francisco: W. H. Freeman and Company. Pp 1–41.

Jennings, Jesse D., and Edward Norbeck
1955 Great Basin prehistory: a review. *American Antiquity* 21:1–11.

Jensen, Peter
1987 Additional Information Supporting: Report on Historic and Archaeological Resources for the Salt Caves Hydroelectric Project, Klamath Falls, Oregon. Prepared by Jensen & Associates Archaeological Consulting and Research, Chico, California. For the City of Klamath Falls, Oregon.

Kittleman, Laurence R.
1973 Mineralogy, Correlation, and Grain-Size Distribution of Mazama Tephra and Other Postglacial Pyroclastic Lavas, Pacific Northwest. *Geological Society of America Bulletin* 84:2957–2980.

Kniffen, Fred B.
1928 Achumawi Geography. *University of California Publications in American Archaeology and Ethnology* 23(5):297–332, Berkeley.

Kroeber, Alfred L.
1925 Handbook of the Indians of California. *Bureau of American Ethnology Bulletin* 78. Washington D.C.

1939 Cultural and Natural Areas of Native North America. *University of California Publications in American Archaeology and Ethnology*, Volume 38. Berkeley.

La Marche, V. C.
1973 Holocene climatic variations inferred from treeline fluctuations in the White Mountains, California. *Quaternary Research* 3:632–660.

1974 Paleoclimatic inferences from long tree-ring records. *Science* 183:1043–1048.

Leonhardy, Frank C., and David G. Rice
1970 A Proposed Culture Typology for the Lower Snake River Region, Southeastern Washington. *North*west Anthropological Research Notes 4(1):1–29.

Loy, William G.
1976 *Atlas of Oregon*. Eugene: University of Oregon Books.

Mack, Joanne Marylynne
1983 Archaeological Investigations in the Salt Cave Locality: Subsistence Uniformity and Cultural Diversity on the Klamath River, Oregon. *University of Oregon Anthropological Papers* 29. Eugene.

1991 Klamath Canyon Prehistory. In *Klamath Canyon Prehistory and Ethnology*, USDI Bureau of Land Management, Cultural Resource Series 8. Portland. Pp 1–110.

Madsen, David B.
1982 Great Basin Paleoenvironments: Summary and Integration. In Man and Environment in the Great Basin, David B. Madsen and James F. O'Connell, eds. *Society for American* Archaeology Special Papers 2:102–104. Washington D.C.

Mehringer, Peter J., Jr.
1977 Great Basin Late Quaternary Environments and Chronology. In Models and Great Basin Prehistory: A Symposium, Don D. Fowler, ed. *Desert Research Institute Publications in the Social Sciences* 12:113–168.

1985 Late-Quaternary Pollen Records from the Interior Pacific Northwest and Northern Great Basin of the United States. In *Pollen Records of Late-Quaternary North American Sediments*, American Association of Stratigraphic Palynologists. Pp 167–189.

Merriam, C. Hart
1955 *Studies of California Indians*. Berkeley: University of California Press.

Moratto, Michael J.
1984 *California Archaeology*. Orlando: Academic Press, Inc.

156

Morrison, Roger B.

1965 Quaternary Geology of the Great Basin. In *The Quaternary of the United States*, H. E. Wright, Jr. and David G. Frey, eds. Princeton: Princeton University Press. Pp 265–285.

O'Connell, James F.

1975 *The Prehistory of Surprise Valley*. Ramona, California: Ballena Press.

O'Connell, James, and J. E. Ericson

1974 Earth Lodges to Wickiups: A Long Sequence of Domestic Structures from the Northern great Basin. Nevada Archaeological Survey Research Report 5:43–61.

O'Connell, James F., and David B. Madsen

1982 Man and Environment in the Great Basin: An Introduction. In Man and Environment in the Great Basin, David B. Madsen and James F. O'Connell, eds. *Society for American* Archaeology Special Papers 2:1–7. Washington D.C.

O'Connell, James, and P. S. Hayward

1972 Altithermal and Medithermal Human Adaptations in Surprise Valley, Northeast California. In Great Basin Cultural Ecology: A Symposium, Don D. Fowler, ed. *Desert Research Institute Publications in the Social Sciences* 8:25–41.

Oetting, Albert C.

1988 Archaeological Investigations on the East Shore of Lake Abert, Lake County, Oregon, Volume 2. *Oregon State Musum of Anthropology OSMA Report* 88-6. Eugene.

1989 Chronology and Prehistoric Settlement Patterning in the Lake Abert-Chewaucan Marsh Basin. Ph.D. dissertation, Department of Anthropology, University of Oregon. Eugene.

1990 Aboriginal Settlement in the Lake Abert-Chwaucan Marsh Basin, Lake County, Oregon. In Wetlands Adaptations in the Great Basin. J. C. Janetski and D. B. Madsen, editors. *Museum of Peoples and Cultures Occasional Papers* 1, Pp 183-206.

Peterson, Roger Tory

1961 *A Field Guide to Western Birds*. Boston: Houghton Mifflin Company.

Peterson, Norman V., and James R. McIntyre

1970 The Reconnaissance Geology and Mineral Resources of Eastern Klamath County and Western lake County, Oregon. *Oregon Department of Geology and Mineral Industries Bulletin* 66. Portland.

157

Pettigrew, Richard M.

1985 Archaeological Investigations on the East Shore of Lake Abert, Lake County, Oregon, Volume 1. *University of Oregon Anthropological Papers* 32. Eugene.

Powers, Stephen

1877 Tribes of California. Contributions North American Ethnology, Volume 3. *U.S. Geographical and Geological Survey of the Rocky Mountain Region.* Washington D.C.: Government Printing Office.

Ray, Verne F.

1963 *Primitive Pragmatists: The Modoc Indians of Northern California.* Seattle: University of Washington Press.

Sampson, C. Garth

1985 Nightfire Island: Later Holocene Lakemarsh Adaptation on the Western Edge of the Great Basin. *University of Oregon Anthropological Papers* 33. Eugene.

Sampson, C. Garth, and Ruth L. Greenspan

1985 Environment and Diet. In Nightfire Island: Later Holocene Lakemarsh Adaptation on the Western Edge of the Great Basin. *University of Oregon Anthropological Papers* 33. Eugene. Pp 193-206.

Silovsky, Gene

1982 The economic/recreational value of the fisheries/wildlife resources of the Fremont National Forest. Lakeview, Oregon: USDA Forest Service, Fremont National Forest.

Silvermoon, Jon Massoglia

1985 *Cultural Resource Overview: Fremont National Forest.* Lakeview, Oregon: USDA Forest Service, Fremont National Forest.

Spier, Leslie

1930 Klamath Ethnography. *University of California Publications in American Archaeology and Ethnology*, Volume 30. Berkeley.

Stern, Theodore

1966 The Klamath Tribe: A People and Their Reservation. *The American Ethnological Society, Monograph* 41. Seattle: University of Washington Press.

Sterns, Gilbert L.

1974 Climates of the States: Oregon. In *Climates of States, Volume II:* Western States. Port Washington: National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Water Information Center, Inc. Pp 841-860.

Steward, Julian R.
1938 Basin-Plateau Aboriginal Sociopolitical Groups. *Bureau of America Ethnology Bulletin* 120. Washington D.C.

Swanson, Earl H., Jr., and Guy Muto
1975 Recent Environmental Changes in the Northern Great Basin. *Tebiwa* 18(1):49-57.

Theodaratus, Inc.
1979 *Cultural Resource Overview of the Winema National Forest. Klamath Falls, Oregon: USDA Forest Service, Winema National Forest.*

Thomas, David Hurst, and Robert L. Bettinger
1976 Prehistoric Pinon Ecotone Settlements of the Upper Recse River Valley, Central Nevada. *Anthropological Papers of the American Museum of Natural History,* Volume 53: Part 3. New York.

True, D. L., and M. A. Baumhoff
1981 Pitted Rock Petroglyphs in Southern California. *Journal of California and Great Basin Anthropology* 3(2):257-268.

Trygg, Ethel
1971 A Study of the McLeaon Artifact Collection from South Central Oregon. M.A. Thesis, Department of Anthropology, University of Oregon. Eugene.

USDA Forest Service
1946 *County Forest Type Map: Eastern Oregon and Eastern Washington.* Portland, Oregon: USDA Forest Service, Pacific Northwest Forest and Range Experiment Station.

1980 Storage Gage Precipitation Measurements. Unpublished manuscript on file at the Fremont National Forest, Lakeview, Oregon.

Warren, Claude N.
1967 The San Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32(2):168-185.

Weide, David L.
1976 The Altithermal as an Archaeological "Non-Problem" in the Great Basin. *Nevada Archaeological Survey Research Paper* 8:174-184. Reno.

Weide, Margaret Lyneis

1968 Cultural Ecology of Lakeside Adaptation in the Western Great Basin. Ph.D. Dissertation, Department of Anthropology, University of California, Los Angeles.

1974 North Warner Subsistence Network: A Prehistoric Band Territory. *Nevada Archaeological Survey Research Paper* 5:62–79. Reno.

Wells, E. L.

1936 Eastern Oregon. In *Climatic Summary of the United States, Climatic Data from the Establishments of Stations to 1930*, R. J. Martin and E. Corbin, eds. U.S. Weather Bureau. Washington, D.C.

Wenzel, David L.

1979 *Soil Resource Inventory: Fremont National Forest*. Lakeview, Oregon: USDA Forest Service, Fremont National Forest.

Young, James A., Raymond A. Evans, and Paul T. Tueller

1976 Great Basin Plant Communities - Pristine and Grazed. In Holocene Environmental Change in the Great Basin, Robert Elston, ed. *Nevada Archaeological Survey Research Paper* 6:187–15. Reno.

PERSONAL COMMUNICATIONS

Orville de Vaul, Oral History Interview, July 18, 1986, USDI Bureau of Land Management Guard Station, Gerber Reservoir, Oregon.

Dennis Jenkins, personal communication, May 24, 1993, Eugene, Oregon.

Craig Skinner, personal communication, May 27, 1993, Eugene, Oregon.

APPENDIX A: PENINSULA SITE PHOTOGRAPHS

Figure A-1 Circular Rock Feature 1.

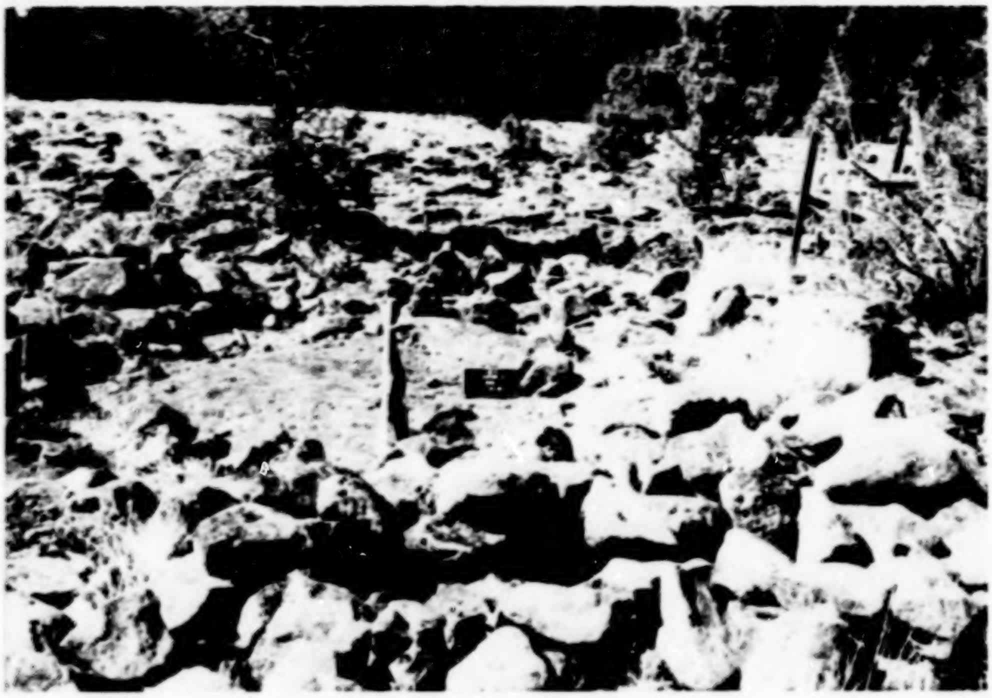


Figure A-2 Circular Rock Feature 15.

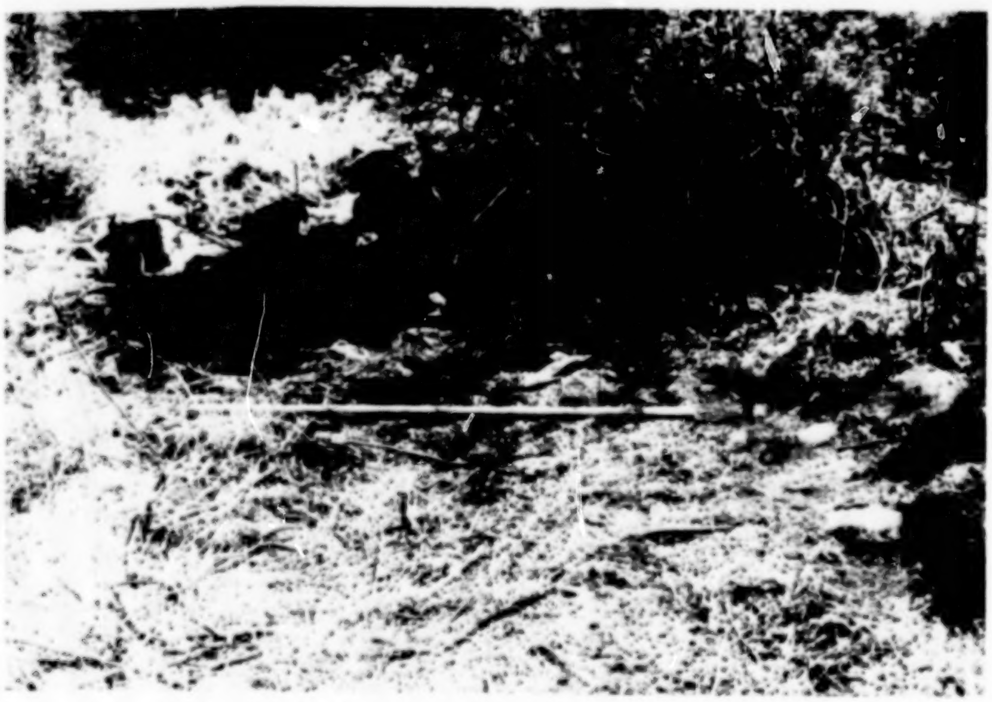


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Figure A-3 Circular Rock Feature 21.

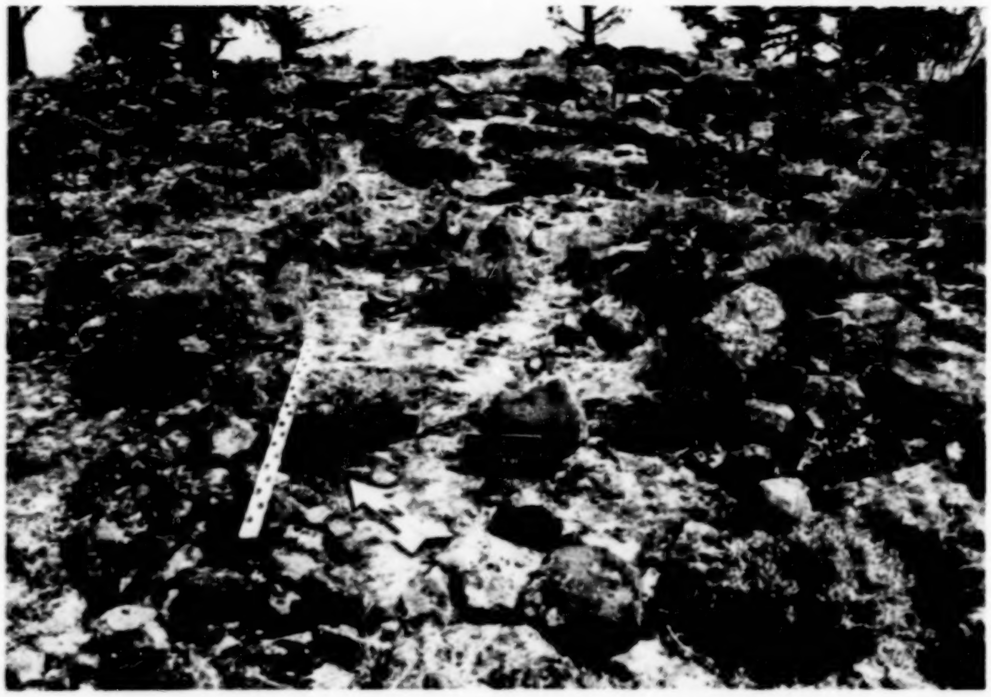

Figure A-4 Photograph of Post Fragment in Unit 195S/260E in Circular Rock Feature 15.

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Figure A-5 The Rectangular Rock Feature.

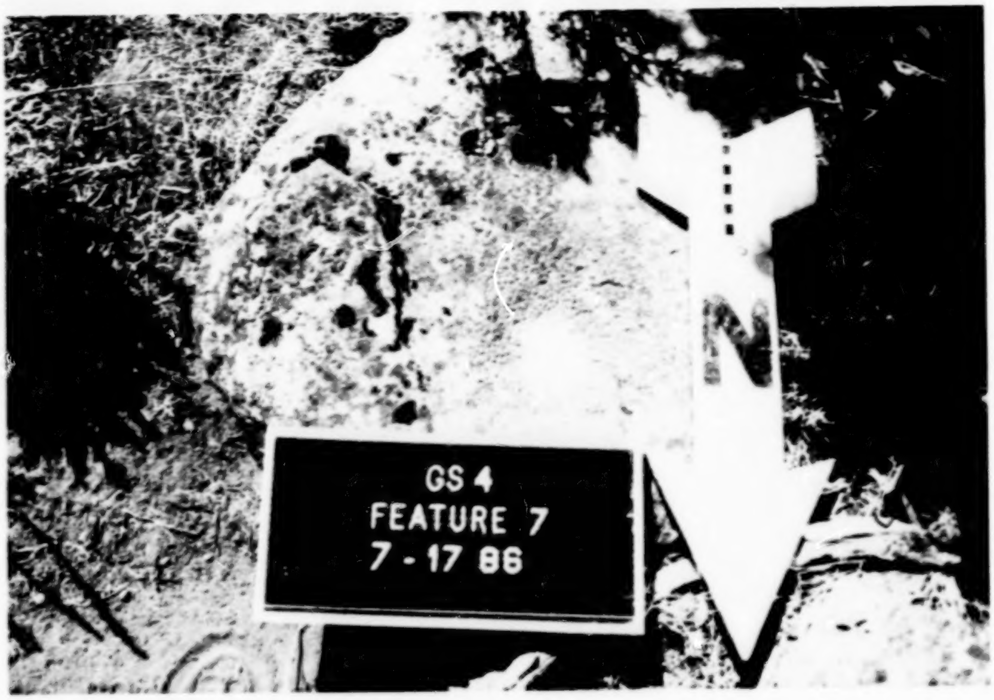

Figure A-6 Boulder Petroglyphs.

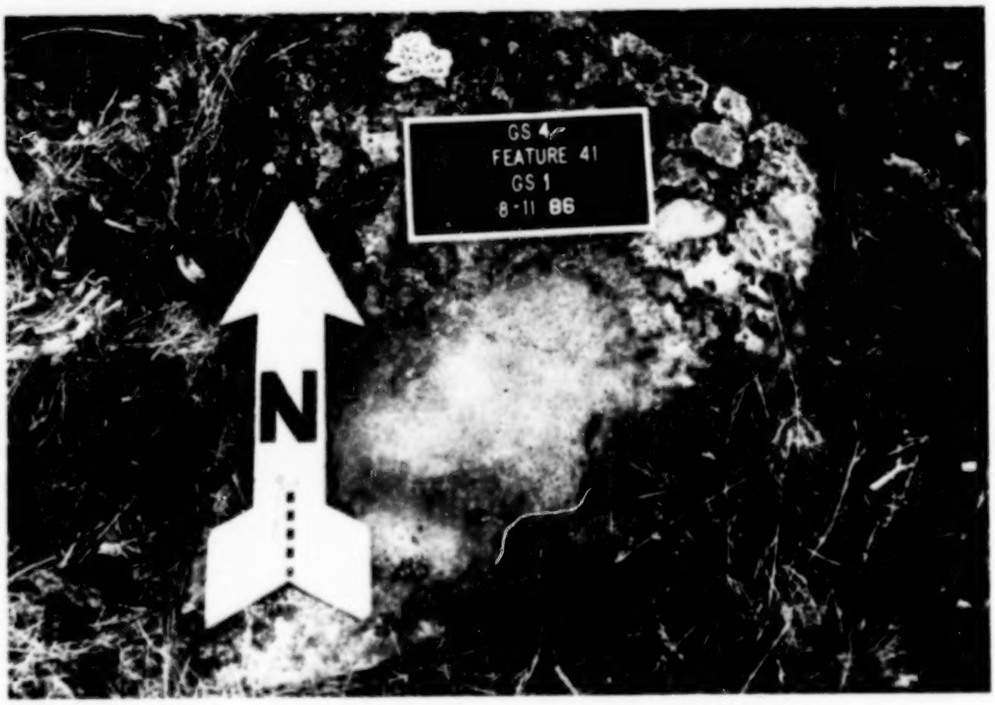

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Figure A-7 Rimrock Petroglyphs.

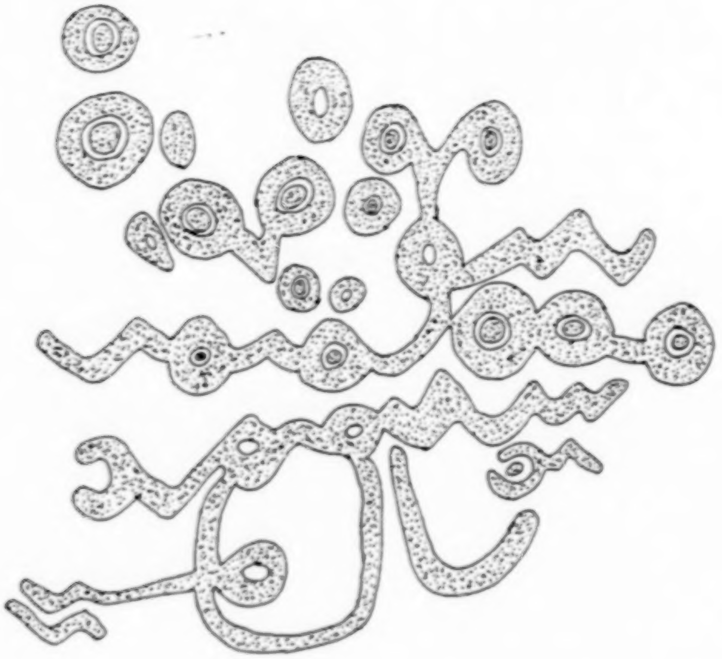

Figure A-8 Mortar 15.

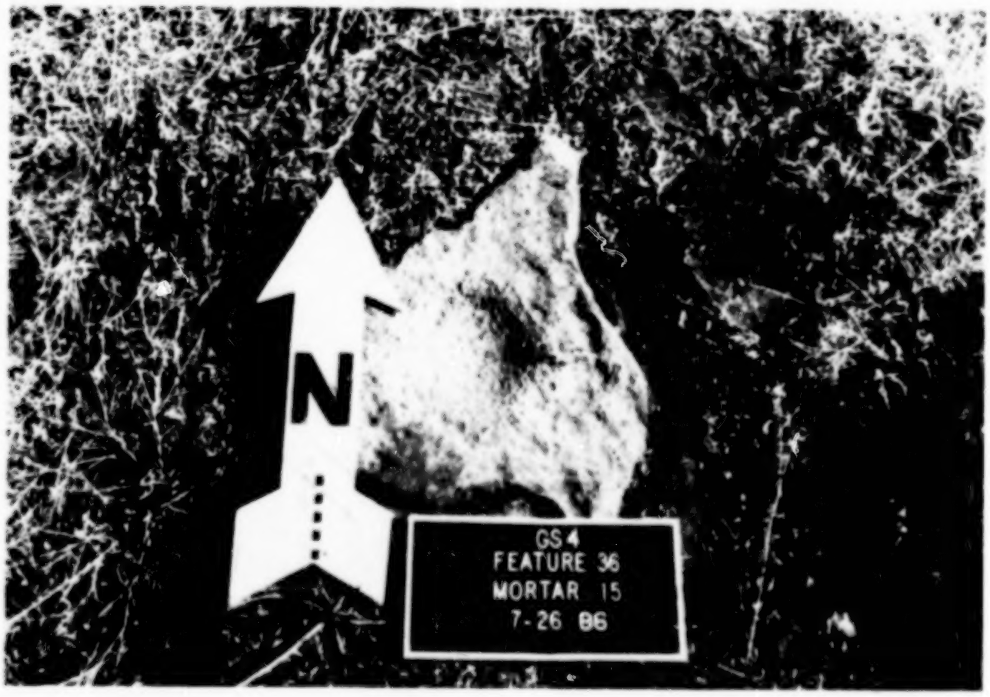

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Figure A-11 Mortar 19.

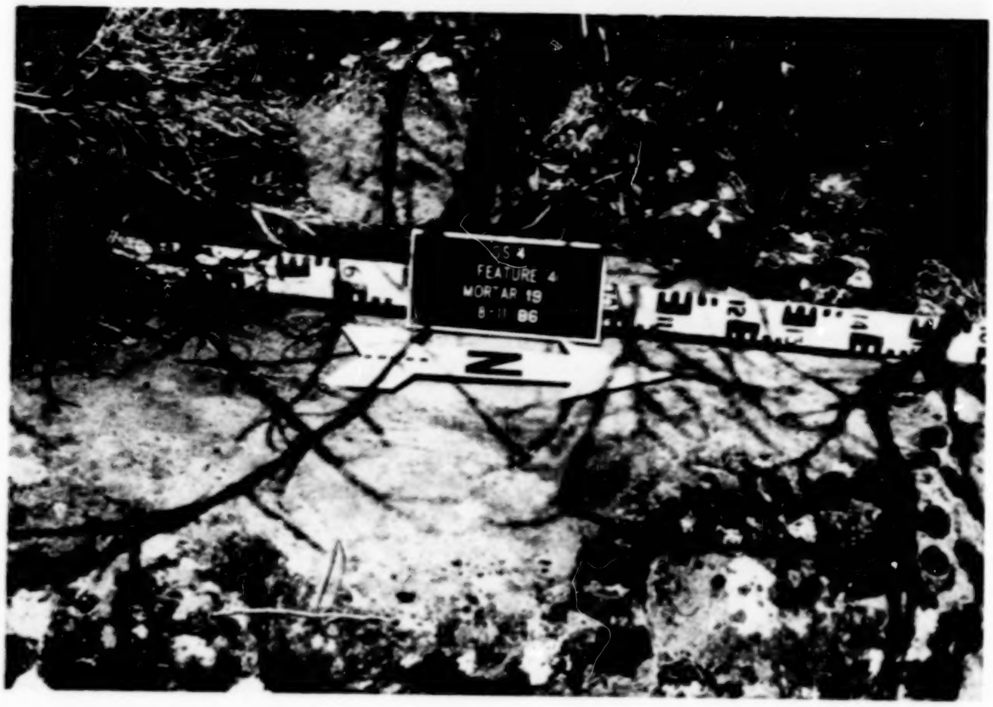

Figure A-12 Mortars 8a-f.

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Figure A-13 Mortar 2.

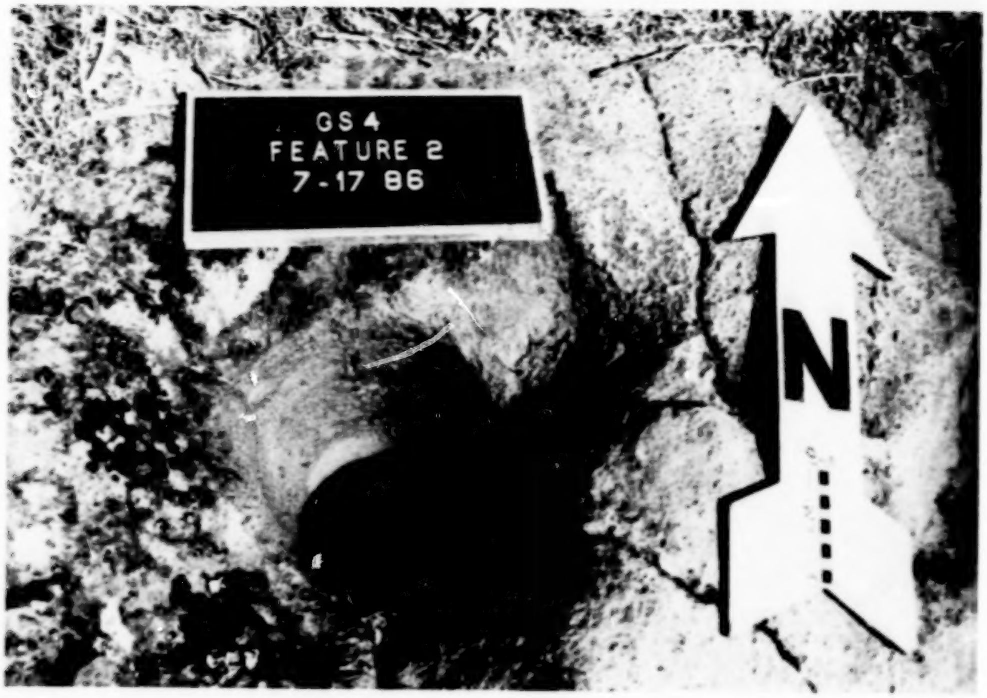

Figure A-14 Mortars 13a-c.

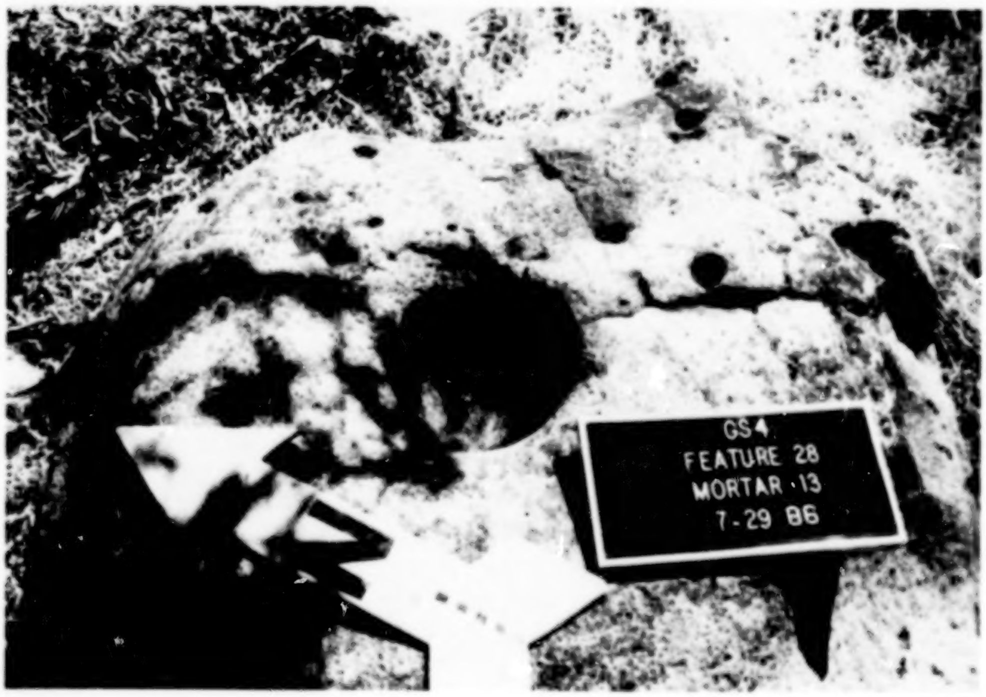

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Figure A-15 Mortar 9a and Enhanced Depressions 9b and 9c.

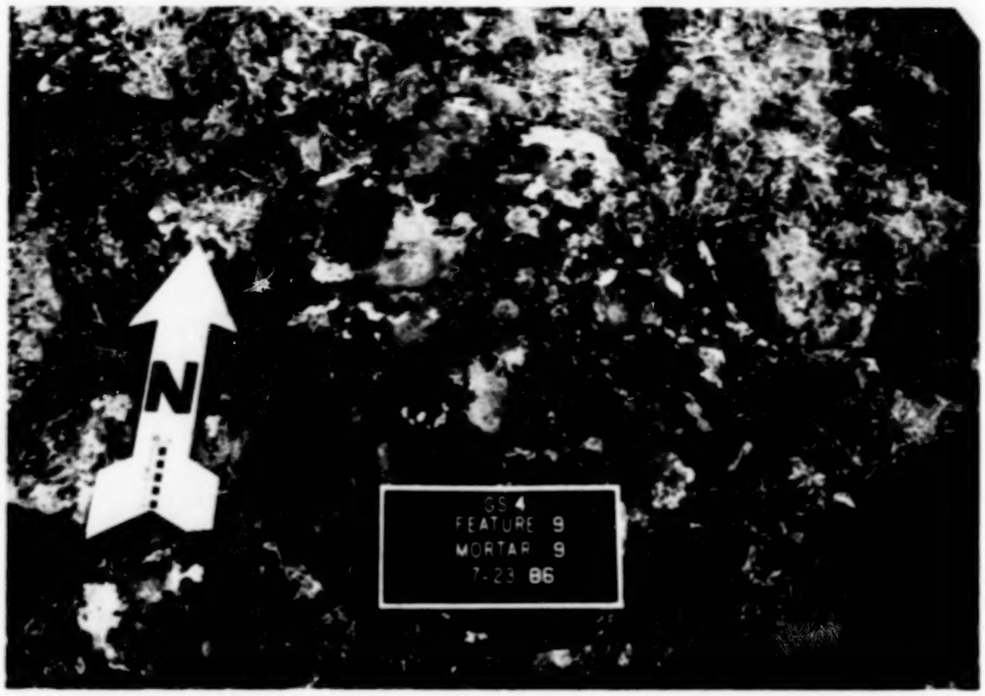

Figure A-16 Metate GS1.

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APPENDIX B: MISCELLANEOUS TABLES

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Table B-1 Vegetation of the Gerber Reservoir Area.

Vegetation	Scientific Name	Pine Forest	Juniper Woodland	Shrub-Steppe	Moist or wet areas
TREES					
white fir	*Abies concolor*	x			
incense cedar	*Calocerdus decurrens*	x			
western juniper	*Juniperus occidentalis*	x	x		
lodgepole pine	*Pinus contorta*	x			
sugar pine	*Pinus lambertiana*	x			
ponderosa pine	*Pinus ponderosa*	x	x		
quaking aspen	*Populus tremuloides*	x	x		
SHRUBS					
serviceberry	*Amelanchier alnifolia*	x			
manzanita	*Arctostaphylos* sp.	x			
low sagebrush	*Artemisia arbuscula*		x	x	
bud sagebrush	*Artemisia spinescens*			x	
big sagebrush	*Artemisia tridentata*	x	x	x	
shadscale	*Artiplex conefertifolia*			x	
Nuttall's saltbush	*Artiplex nuttallii*			x	
Oregon grape	*Berberis aquifolium*	x			
ceanothus	*Ceanothus* sp.	x			
mountain mahogany	*Cercocarpus ledifolius*	x	x		
rabbitbrush	*Haplopappus bloomeri*	x	x	x	
granite gilia	*Leptodactylon pungens*		x		
twinberry	*Lonicera* sp.	x			
plums	*Prunus* sp.	x			
chokecherry	*Prunus virginiana*	x			
bitterbrush	*Purshia tridentata*		x		
currant	*Ribes* sp.	x		x	
trailing blackberry	*Rubus ursinus macropetalus*	x			
willow	*Salix* sp.	x	x		x
blue elderberry	*Sambucus coerulea*	x			
snowberry	*Symphoricarpos* sp.	x		x	
gray horsebush	*Tetradymia cansecens*		x		
huckleberry	*Vaccinium* sp.	x			

Table B-1 Vegetation of the Gerber Reservoir Area (continued).

Vegetation	Scientific Name	Pine Forest	Juniper Woodland	Shrub-Steppe	Moist or wet areas
FORBS					
yarrow	*Achillea millefolium lanulosa*	x			
aster	*Aster* sp.	x			
balsamroot	*Balsamorhiza sagittaria*	x	x	x	x
sego lily	*Calochortus macrocarpus*				x
camas	*Cassia quamash*				x
epos	*Carum* sp.				
lamb's quarter	*Chenopodium fremontii*			x	
buckwheat	*Eriogonum umbellatum*			x	
strawberry	*Fragaria* sp.	x			
plantain	*Goodyera oblongifolia*	x			
manna grass	*Glyceria occidentalis*			x	
spiny hopsage	*Grayia spinosa*			x	
narrowleaf goldenweed	*Haplopappus bloomeri*			x	
sunflower	*Helianthus* sp.			x	
desert parsley	*Lomatium canbyi*			x	
biscuitroot	*Lomatium* sp.	x			
lupine	*Lupinus* sp.	x			
tarweed	*Madia glumerata*			x	
blazing star	*Mentzelia albicaulis*			x	x
water-lily (wokas)	*Nuphor polysephalum*				x
sago pondweed	*Potamogeton pectinatus*				x
widegeon grass	*Rappia maritima*				x
willow dock	*Rumex salicofolius*				
greasewood	*Sacrobatus vermiculatus*			x	x
arrowroot	*Sagittaria cuneata*				x
tule	*Scirpus acutus*				
plain's mustard	*Sisymbrium linifolium*			x	x
bur weed	*Sparganium eurycarpus*				
dandelion	*Taraxacum officinale*	x			x
cattail	*Typha latifolia*				
vetch	*Vicia americana*	x			x
white camas	*Zygadenus venenosis*				

Table B-1 Vegetation of the Gerber Reservoir Area (continued).

Vegetation	Scientific Name	Pine Forest	Juniper Woodland	Shrub-Steppe	Moist or wet areas
GRASSES					
intermediate wheatgrass	*Agropyron intermedium*	x			
bluebunch wheatgrass	*Agropyron spicatum*	x	x		
mountain brome	*Bromus marginatus*	x			
cheatgrass brome	*Bromus tectorum*	x			
onespike oatgrass	*Danthonia unispicata*			x	
tufted hairgrass	*Deschampsia caespitosa*				x
alkali saltgrass	*Distichlis stricta*			x	
giant wildrye	*Elymus cinerus*	x			
creeping wildrye	*Elymus triticoides*			x	
Idaho fescue	*Festuca idahoensis*	x	x		
northern meadow barley	*Hordeum brachyantherum*	x			
timothy	*Phleum pratense*	x			
Wheeler's bluegrass	*Poa nervosa*	x			
Kentucky bluegrass	*Poa pratensis*	x			
Sandberg bluegrass	*Poa sandbergii*		x		
bottlebrush squirreltail	*Sitanion hystrix*	x	x		
western needlegrass	*Stipa occidentalis*		x		
Thurber needlegrass	*Stipa thurberiana*	x			
SEDGES	*Carex* sp.				x
RUSHES	*Juncus* sp.				x

Table B-2 Birds of the Gerber Reservoir Area.

Order	Common Name	Scientific Name
Aviformes	common loon	*Gavia immer*
Podicipediformes	western grebe	*Aechmorphus occidentalis*
	horned grebe	*Podiceps auritus*
	red-necked grebe	*Podicpes grisegena*
	pied-billed grebe	*Podilymbus podiceps*
Pelicaniformes	white pelican	*Pelcanus erythrorhynchos*
	double breasted comorant	*Phalacrorax auritus*
Ciconoformes	great blue heron	*Ardea herodias*
	American bittern	*Botaurus lentiginosus*
	least bittern	*Ixobrychus lentiginosus*
	snowy egret	*Leucophoyx thula*
	black-crowned night heron	*Nycticorax nycticorax*
Anseriformes	pintail	*Anas acuta*
	American wigeon	*Anas americana*
	green-winged teal	*Anas crecca*
	northern shoveler	*Anas clypeata*
	cinnamon teal	*Anas cyanoptera*
	gadwall	*Anas strepera*
	mallard	*Anas platyrynchos*
	white-fronted goose	*Anser albifrons frontalis*
	lesser snow goose	*Anser caerulescens*
	Ross's goose	*Anser rossi*
	redhead	*Aythya americana*
	ringnecked duck	*Aythya collaris*
	canvasback	*Aythya vallisineria*
	lesser scaup	*Aythya affinia*
	Canada goose	*Branta* canadensis
	cackling goose	*Branta canadensis minima*
	bufflehead	*Bucephala albeola*
	black tern	*Chlidonias niger*
	American coot	Fulica americana
	hooded merganser	*Laphodytes cucullatus*
	common merganser	*Mergus merganser*
	trumpeter swan	*Olor buccinator*
	ruddy duck	*Ocyura jamaicensis*
	shoveler	*Spatula clypeata*
Gruiformes	willet	*Catoptrophus semipalmatus*
	sandhill crane	*Grus canadensis*
	long-billed curlew	*Numenius americanus*
	Sora	*Porzana carolina*
	Virginia rail	*Rallus limicola*
	American avocet	*Recurvirostra americana*
	Wilson's phalarope	*Steganopus tricolor*

Table B-2 Birds of the Gerber Reservoir Area (continued).

Order	Common Name	Scientific Name
Charadriiformes	spotted sandpiper	*Actitus macularia*
	common snipe	*Capella gallinago*
Galliformes	ruffed grouse	*Bonasa umbellus*
	blue grouse	*Dendragapus obscurus*
	California quail	*Lophortyx californicus*
	mountain quail	*Oreortyx pictus*
Falconiformes	Coopers hawk	*Accipiter cooperii*
	goshawk	*Accipiter gentilis*
	sharp-skinned hawk	*Accipiter striatus*
	golden eagle	*Aquila chrysaetos*
	red-tailed hawk	*Bueo jamaicensis*
	ferruginous hawk	*Buteo regalis*
	Swainson's hawk	*Buteo swainsonia*
	turkey vulture	*Cathartes aura*
	marsh hawk	*Circus cyaneus*
	merlin	*Faloc columbarius*
	prairie falcon	*Falco mexicanus*
	peregrine falcon	*Falco peregrinus*
	American kestrel	*Falco sparverius*
	bald eagle	*Haliaeetus leucocephalus*
	osprey	*Pandion haliaetus*
Strigiformes	saw-whet owl	*Aegolius acadicus*
	short-eared owl	*Asio flammeus*
	long-eared owl	*Asio otus*
	great horned owl	*Bubo virginianus*
	screech owl	*Otus asio*
	great grey owl	*Strix nebulosa*
	barn owl	*Tyto alba*
Columbiformes	rock dove	*Columbia livia*
	mourning dove	*Zenaida macroura*
Caprimulgiformes	whippoor-will	*nuttallii*
Apodiformes	Vaux's swift	*Chaetura vauxi*
Trochilidae	rufous hummingbird	*Selasphorus rufus*
	calliope hummingbird	*Stellula calliope*
Piciformes	Lewis woodpecker	*Asyndesmus lewis*
	common flicker	*Colaptes auratus*
	downy woodpecker	*Dendrocopus pubescens*
	black-headed three-toed woodpecker	*Stipa thurberiana*
	Williamson's sapsucker	*Sphyrapicus thyroideus*
	yellow-bellied sapscuker	*Sphyrapicus varius*

Table B-2 Birds of the Gerber Reservoir Area (continued).

Order	Common Name	Scientific Name
Passeriformes	red-winged blackbird	*Agelaius phoeniceus*
	sage sparrow	*Amphispiza belli*
	scrub jay	*Aphelocoma coerulescens*
	cedar waxwing	*Bombycilla cedrorum*
	western wood peewee	*Cantopus sordidulus*
	Cassin's finch	*Caprodacus cassinii*
	hermit thrush	*Catharus guttatus*
	canon wren	*Catherpes mecianus*
	brown creeper	*Certhia familiaris*
	green-tailed towhee	*Chlorura chlorura*
	lark sparrow	*Chondestes grammacus*
	dipper or water ouzel	*Cinclus mexicanus*
	common raven	*Corvus corax*
	common crow	*Corvus brachyrhynchos*
	Stellar's jay	*Cyanocitta stelleri*
	yellow-rumpled warbler	*Dendroica coronata*
	black-throated gray warbler	*Dendroica nigrescens*
	yellow warbler	*Dendroica petechia*
	western flycatcher	*Empidonax difficilis*
	Hammond's flycatcher	*Empidonax hammondii*
	dusky flycatcher	*Empidonax oberholseri*
	willow flycatcher	*Empidonax trailii*
	horned lark	*Eremophila alpestris*
	Brewer's blackbird	*Euphagus cyanocephalus*
	pinon jay	*Gymnorhinus cyanocephalus*
	barn swallow	*Hirundo rustica*
	Swainson's thrush	*Hylocichla ustulata*
	yellow-breasted chat	*Icteria virens*
	northern oriole	*Icterus galbula*
	dark-eyed junco	*Junco hyemalis*
	tree swallow	*Iridoprocne bicolor*
	varied thrush	*Ixoreus naevius*
	loggerhead shrike	*Lanius ludovicianus*
	red crossbill	*Loxia curvirostra*
	brown-headed cowbird	*Molothrus ater*
	Townsend's solitaire	*Myadestes townsendi*
	ash-throated flycatcher	*Nuttallornis borealis*
	olive-sided flycatcher	*Myiarchus cincerascens*
	MacGillivary's warbler	*Oporornis tolmiei*
	sage thrasher	*Oreoscoptes montanus*
	black-capped chickadee	*Parus atricapillus*
	mountain chickadee	*Parus gambeli*
	plain titmouse	*Parus inornatus*
	savannah sparrow	*Passerculus sandwichensis*
	fox sparrow	*Passerella iliaca*

Table B-2 Birds of the Gerber Reservoir Area (continued).

Order	Common Name	Scientific Name
Passeriformes	Lazuli bunting	Passerine amoena
	gray jay	*Perisoreus canadensis*
	cliff swallow	Petrochelidon pyrrhonata
	black-headed grosbeak	Pheusticus melanocephalus
	black-billed magpie	*Pica pica*
	western tanager	*Piranga ludoviciana*
	vesper sparrow	*Pooecetes gramineus*
	purple martin	*Progne subis*
	common bushtit	*Psaltriparus minimus*
	ruby crowned kinglet	*Regulus calendula*
	golden crowned kinglet	*Regulus catrapa*
	rock wren	*Salpinctes obsoletus*
	Say's phoebe	*Sayornis saya*
	mountain bluebird	*Sialia currucoides*
	western bluebird	*Silaia mexicana*
	red-breasted nuthatch	*Sitta canadensis*
	pygmy nuthatch	*Sitta pygmaea*
	pine siskin	*Spinus pinus*
	Brewer's sparrow	*Spizella breweri*
	rough-winged swallow	*Stelgidopteryx ruficollis*
	western meadowlark	*Sturnella neglecta*
	starling	*Sturnus vulgaris*
	violet-green swallow	*Tachycineta thalassina*
	long-billed marsh wren	*Telmatodytes palustris*
	Bewick's wren	*Thryomanes bewickii*
	house wren	*Troglodytes aedon*
	winter wren	*Troglodytes troglodytes*
	American robin	*Turdus migratorius*
	western kingbird	*Tyrannus verticalis*
	orange-crowned warbler	*Vermivora celata*
	Nashville warbler	*Vermivora ruficapilla*
	warbling vireo	*Vireo gilvus*
	red-eyed vireo	*Vireo glivaceus*
	solitary vireo	*Vireo solitarius*
	Wilson's warbler	*Wilsonia pusilla*
	yellow-headed blackbird	*Xanthocephalus xanthocephalus*

Table B-3 Amphibians, Lizards, Skinks, Snakes, Eels, and Fish of the Gerber Reservoir Area.

Animal	Common Name	Scientific Name
Amphibians	long-toed salamander	*Ambystoma macrodactylum*
	western toad	*Bufo boreas*
	Pacific tree frog	*Hyla regilla*
	spotted frog	*Rana pretiosa*
Lizards	short-horned lizard	*Phyrnosoma douglassi*
	sagebrush lizard	*Sceloporus graciosus*
	western skink	*Sceloporus occidentalis*
Skinks	western skink	*Eumeces skiltonianus*
Snakes	rubber boa	*Charina bottae*
	racer	*Coluber constrictor*
	western rattlesnake	*Crotaluis viridis*
	striped whipsnake	*Masticophis taeniatus*
	gopher snake	*Pituophus melanoleucus*
	western terrestrial garter snake	*Thamnophis elegans*
	common garter snake	*Thamnophis sirtalis*
Eels	Pacific lamprey	*Entosphenus tridentatus*
	Pit-Klamath brook lamprey	*Lampetra lethophaga*
Fish	Lost River sucker	*Catostomus luxatus*
	Klamath largescale sucker	*Catostomus snyderi*
	shortnose sucker	*Chasmistes brevirostris*
	marbled sculpin	*Cottus klamathensis*
	slender sculpin	*Cottus tenuis*
	blue chub	*Gila coerulea*
	tui chub	*Gila bicolor*
	brown bullhead	*Ictaluras nebulosus*
	pumpkin seed	*Lepomis gibbosus*
	bluegill sunfish	*Lepomis macrochirus*
	largemouth bass	*Micropterus salmoides*
	speckled dace	*Rhinichthys osculus*
	rainbow trout	*Salmo gairdneri*
	brown trout	*Salmo trotta*
	brook trout	*Salvelinus fontinalis*

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Table B-4 Mammals of the Gerber Reservoir Area.

Animal	Common Name	Scientific Name
Gophers	northern pocket gopher	*Thomomys talpoides*
Chipmunks	yellow-pine chipmunk	*Eutamias amoenus*
	least chipmunk	*Eutamias minimus*
	Townsend's chipmunk	*Eutamias townsendii*
Squirrels	northern flying squirrel	*Galucomys sabrinus*
	western gray squirrel	*Sciurus griseus*
	Belding's ground squirrel	*Spermophilus beldingi*
	golden-mantled ground squirrel	*Spermophilus lateralis*
	Douglas squirrel	*Tamiasciurus douglassii*
Rats	rat	*Dipodmys heermanni*
	bushy-tailed woodrat	*Neotoma cinerea*
	Norway rat	*Rattus norveigicus*
Mice	house mouse	*Mus musculus*
	northern grasshopper mouse	*Onychomys leucogaster*
	canyon mouse	*Peromyscus crinitus*
	pinon mouse	*Peromyscus truei*
	Great Basin pocket mouse	*Perognathus parvus*
	western harvest mouse	*Reithrodontomys megalotis*
	western jumping mouse	*Zapus principeps*
Muskrat	muskrat	*Ondatra zibethicus*
Beaver	beaver	*Castor canadensis*
Porcupine	porcupine	*Erethizon dorsatum*
Rabbits and Hares	black-tailed jack rabbit	*Lepus californicus*
	white-tailed jack rabbit	*Lepus townsendii*
	pygmy rabbit	*Sylvilagus idahoensis*
	Nuttall's cottontail	*Sylvilagus nuttallii*
Shrews	water shrew	*Sorex palustrugus*
	Trowbridge's shrew	*Sorex trowbridgii*
	vagrant shrew	*Sorex vagrans*
Bats	pallid bat	*Antrozus pallidus*
	big brown bat	*Eptesicus fuscus*
	silver-haired bat	*Lasionycteris noctivagans*
	hoary bat	*Lasiurus cinnereus*
	Townsend's big-eared bat	*Plecotus townsendii*
Myotis	California myotis	*Myotis californicus*
	small-footed myotis	*Myotis leibii*
	little brown myotis	*Myotis lucifugus*
	long-legged myotis	*Myotis volans*
	Yuma myotis	*Myotis yumanensis*
Racoon	racoon	*Procyon lotor*

Table B-4 Mammals of the Gerber Reservoir Area (continued).

Animal	Common Name	Scientific Name
Skunks	striped skunk western spotted skunk	*Mephitis mephitis* *Spilogale gracilis*
Badger	badger	*Taxidea taxus*
Voles	long-tailed vole montane vole	*Microtus longicaudus* *Microtus montanus*
Marmots	yellow-bellied marmot	*Marmota flavientus*
Moles	broad-footed mole	*Scapenus latimanus*
Marten	marten	*Martes americana*
Ermine	ermine	*Mustela erminea*
Weasel	longtail weasel	*Mustela fremata*
Mink	mink	*Mustela vison*
Pikas	pika	*Ochotona principeps*
Cats	mountain lion bobcat	*Felis concolor* *Felis rufus*
Bears	black bear	*Ursus americanus*
Canine	domesticated dogs coyote	*Canis familiaris* *Canis latrans*
Antelope	pronghorn antelope	*Antilocarpa americana*
Deer	mule deer	*Odocoileus hemionus*
Elk	Roosevelt elk	*Cervus elephus*

Table B-5 Rock Ring Data from the East Shore Lake Abert Sites (compiled and calculated from Connolly and Pettigrew 1985:91-100).

Site	Rock Rings (CRF[1]) at elevations <9.5 m				Rock Rings (CRF) at elevations 9.5-15.5 m				Rock Rings (CRF) at elevations >15.5 m				Rock Rings (CRF) at all elevations[2]			
	CF[1]	CRF	%	Mean d[3]	CF	CRF	%	Mean d	CF	CRF	%	Mean d	CF	CRF	%	Mean d
35LA481	-	-	-	-	-	-	-	-	-	-	-		23	4	17.4	4.35
35LA485	-	-	-	-	-	-	-	-	5	1	20.0	4.40	5	1	20.0	4.40
35LA487	5	3	60.0	4.13	8	2	25.0	2.55	2	1	50.0	2.40	15	6	40.0	3.32
35LA490	3	-	-	-	10	3	30.0	4.47	-	-	-	-	14	3	21.4	4.47
35LA494	4	-	-	-	6	2	33.3	5.13	5	-	-	-	15	2	13.3	5.13
35LA534	7	1	14.3	6.10	47	8	17.0	3.71	16	7	43.8	2.94	72	16	22.2	3.53
35LA536	34	-	-	-	5	-	-	-	18	11	61.1	3.88	57	11	19.3	3.88
35LA538	-	-	-	-	1	1	100.0	4.20	-	-	-	-	1	1	100.0	4.20
35LA539	-	-	-	-	-	-	-	-	2	2	100.0	3.30	2	2	100.0	3.30
35LA541	-	-	-	-	1	-	-	-	1	1	100.0	4.30	2	1	50.0	4.30
35LA542	-	-	-	-	1	1	100.0	6.20	6	1	16.7	6.30	7	2	28.6	6.25
35LA543	-	-	-	-	-	-	-	-	1	1	100.0	1.80	1	1	100.0	1.80
Total-1[4]	12	4	33.3	4.63	73	17	23.3	4.05	51	25	49.0	3.56	214	50	23.4	3.88
Total-2[4]	53	4	6.1	4.63	79	17	21.5	4.05	56	25	44.6	3.56		50	23.4	3.88

[1] CRF = Circular rock feature; CF = Circular feature.

[2] Data for all elevations category includes data from CFs and CRFs whose elevations were not reported.

[3] Mean d = Mean diameter

[4] Total-1 includes CF totals for each elevation category which represents only those sites which had CRFs among the CFs in that elevation cateogry. Total-2 includes CF totals for each elevation category including all sites, even those without CRFs.

Table B-6 Frequency of Circular Rock Feature Diameter Classes by Elevation Group at the East Shore Lake Abert Sites (compiled and calculated from Connolly and Pettigrew 1985:91-100).

	Elevation <9.5 m			Elevation 9.5-15.5 m			Elevation >15.5 m			Elevation >9.5 m		
Diameter:	<4m	4-6m	>6m	<4m	4-6m	>6m	<4m	4-6m	>6m	<4m	4-6m	>6m
35LA485	-	-	-	-	-	-	-	1	-	-	1	-
35LA487	1	2	-	2	-	-	2	-	-	2	-	-
35LA490	-	-	-	1	2	-	-	-	-	1	2	-
35LA494	-	-	-	-	2	-	-	-	-	-	2	-
35LA534	-	-	1	5	3	-	6	1	-	11	4	-
35LA536	-	-	-	-	-	-	6	5	-	6	5	-
35LA538	-	-	-	-	1	-	-	-	-	-	1	-
35LA539	-	-	-	-	-	-	1	1	-	1	1	-
35LA541	-	-	-	-	1	-	-	-	-	-	1	-
35LA542	-	-	-	-	-	-	-	-	2	-	-	2
35LA543	-	-	-	-	-	-	1	-	-	1	-	-
Total	1	2	1	8	9	0	16	8	2	22	17	2
% CRF	25.0	50.0	25.0	47.1	52.9	0	61.5	30.8	7.7	53.7	41.5	4.9
% CF	11.1	75.3	13.6							28.0	51.0	21.1

CRF = Circular rock feature; CF = Circular feature.

Table B-7 Debitage Types by Provenience Unit.

Unit	Lvl		Primary Cortex Flakes				Secondary Cortex Flakes				Interior Flakes				Flake Fragments				Angular Waste/Debris				
		Type	1	2	3	4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	N
23.5N/ 1.5E & 23.5N/ 2.0E	1	Obs	0	0	0	0	0	1	0	0	37	70	2	0	29	53	3	0	2	9	0	0	206
		CCS	0	0	0	0	0	0	0	0	0	3	0	0	0	7	0	1	0	2	0	0	13
		Bst	0	0	0	0	0	0	0	0	1	5	2	0	0	5	2	0	0	0	0	0	15
		PW	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3
	2	Obs	0	0	0	0	0	0	0	0	1	23	3	0	4	12	1	1	0	2	0	0	47
		CCS	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	4
		Bst	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	3
11.5N/ 34.5E	1	Obs	0	0	0	0	0	0	0	0	11	12	0	0	18	16	0	0	0	1	0	0	58
		CCS	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	3
		Bst	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	2	Obs	0	0	0	0	0	0	0	0	0	1	1	0	5	0	0	0	0	0	0	0	7
		CCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
		Bst	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	3
16N/ 38E	1	Obs	1	0	0	0	0	0	0	0	12	7	0	0	4	3	0	0	0	1	0	0	28
		CCS	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
		Bst	0	0	0	0	0	1	0	0	1	2	0	0	0	4	1	0	0	0	0	0	10
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
	2	Obs	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	4
		Bst	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1

Table B-7 Debitage Types by Provenience Unit.

Unit	Lvl		Primary Cortex Flakes				Secondary Cortex Flakes				Interior Flakes				Flake Fragments				Angular Waste/Debris				
		Type	1	2	3	4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	N
23.5N/ 1.5E & 23.5N/ 2.0E	1	Obs	0	0	0	0	0	1	0	0	37	70	2	0	29	53	3	0	2	9	0	0	206
		CCS	0	0	0	0	0	0	0	0	0	3	0	0	0	7	0	1	0	2	0	0	13
		Bst	0	0	0	0	0	0	0	0	1	5	2	0	0	5	2	0	0	0	0	0	15
		PW	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3
	2	Obs	0	0	0	0	0	0	0	0	1	23	3	0	4	12	1	1	0	2	0	0	47
		CCS	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	4
		Bst	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	3
11.5N/ 34.5E	1	Obs	0	0	0	0	0	0	0	0	11	12	0	0	18	16	0	0	0	1	0	0	58
		CCS	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	3
		Bst	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	2	Obs	0	0	0	0	0	0	0	0	0	1	1	0	5	0	0	0	0	0	0	0	7
		CCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
		Bst	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	3
16N/ 38E	1	Obs	1	0	0	0	0	0	0	0	12	7	0	0	4	3	0	0	0	1	0	0	28
		CCS	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
		Bst	0	0	0	0	0	1	0	0	1	2	0	0	0	4	1	0	0	0	0	0	10
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
	2	Obs	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	4
		Bst	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1

Table B-7 Debitage Types by Provenience Unit (continued).

Unit	Lvl		Primary Cortex Flakes				Secondary Cortex Flakes				Interior Flakes				Flake Fragments				Angular Waste/Debris				
		Type	1	2	3	4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	N
47S/ 145E & 47S/ 146E	1	Obs	0	1	0	0	0	0	0	0	6	22	2	0	6	15	3	0	2	1	0	0	58
		CCS	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	1	0	5
		Bst	0	0	0	0	0	0	0	0	1	1	3	2	0	0	0	0	1	1	0	0	9
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	2	Obs	0	0	0	0	0	2	0	0	1	11	0	0	2	8	1	0	0	2	0	0	27
		CCS	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
		Bst	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	3
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	3	Obs	0	0	0	1	0	1	0	0	8	13	0	0	2	10	6	0	0	0	0	0	41
		CCS	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	1	0	4
		Bst	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	4
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
	4	Obs	0	0	0	0	0	0	0	0	3	12	1	0	4	10	0	0	0	0	0	0	30
		Bst	0	0	0	0	0	0	0	0	0	2	0	0	0	2	1	1	0	0	0	0	6
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	5	Obs	0	0	0	0	0	0	0	0	5	8	1	0	4	8	5	0	2	0	0	0	33
		CCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		Bst	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	3
	6	Obs	0	0	0	0	0	2	0	0	11	7	0	0	1	15	0	0	0	0	0	0	37
		Bst	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	0	0	0	0	4
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	2

Table B-7 Debitage Types by Provenience Unit (continued).

Unit	Lvl		Primary Cortex Flakes				Secondary Cortex Flakes				Interior Flakes				Flake Fragments				Angular Waste/Debris				
		Type	1	2	3	4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	N
197S/ 260E	1	Obs	0	2	0	0	0	5	2	1	29	30	3	0	21	36	0	0	0	4	3	0	136
		CCS	0	0	0	0	0	0	0	0	0	2	1	0	2	1	1	0	0	2	0	1	10
		Bst	0	0	0	0	0	1	1	1	0	0	0	0	1	10	2	0	0	0	0	0	16
		PW	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	2	Obs	0	0	0	0	0	0	0	0	22	48	3	0	24	54	8	1	1	2	2	0	165
		CCS	0	0	0	0	0	0	0	0	0	3	0	0	2	3	1	0	0	0	0	1	10
		Bst	0	0	0	0	0	0	0	0	0	4	2	1	3	7	4	0	0	0	0	0	21
		PW	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	3	Obs	0	0	1	0	0	0	0	0	1	3	3	0	0	8	2	0	0	1	0	0	19
		CCS	0	0	0	0	0	0	0	0	0	3	0	0	1	5	0	0	0	1	1	1	12
		Bst	0	0	0	0	0	0	0	0	0	3	2	3	1	8	2	1	0	0	0	0	20

Table B-7 Debitage Types by Provenience Unit (continued).

Unit	Lvl		Primary Cortex Flakes				Secondary Cortex Flakes				Interior Flakes				Flake Fragments				Angular Waste/Debris				
		Type	1	2	3	4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	1	2	3	≥4	N
197.5S/ 271.5E	1	Obs	0	0	0	0	0	0	0	0	2	1	0	0	2	5	1	0	0	0	0	0	11
		CCS	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	1	0	0	4
		Bst	0	0	0	0	0	0	0	0	0	3	1	1	0	5	0	0	0	0	0	0	10
		PW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2
	2	Obs	0	0	0	0	0	0	1	0	0	3	1	0	2	2	0	0	0	0	0	0	9
		CCS	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	4
		Bst	0	0	0	0	0	0	0	0	0	3	1	0	1	0	0	2	0	0	0	0	7
	3	Obs	0	0	1	0	0	0	1	0	1	3	0	0	0	5	0	0	0	0	0	0	11
		CCS	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
		Bst	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	3
	4	CCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		Bst	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2

Note: Numerical designations above columns denote size classes in 1 cm increments.

Table B-8 Flaked Stone Tools.

Number 626-87-n	Type	Material type	Size	Working Edge		Use Wear		
				Shape	Angle	UFA	BFA	Type
1-S-1	CR	Obsidian	3					
1-1-1	BF	Basalt	9					
1-1-2	BFUF	Obsidian	3	Straight	50		x	Nibbles and snap fractures
1-1-2	BF	Obsidian	3					
1-1-3	FU	Obsidian	4	Straight	86	x		Nibbles, stepping, and grinding
1-1-3	FU	Obsidian	4	Convex	86	x		Nibbles, stepping, and grinding
1-1-3	FU	Obsidian	4	Double-concave	75	x		Nibbles and stepping
1-1-3	FU	Obsidian	4	Flaked 2 intersecting edges to point	75	x		Nibbles, stepping, and grinding
1-1-4	UFUF	Obsidian	3	Convex	83	x		Nibbles, stepping, and grinding
1-1-4	FU	Obsidian	3	Convex	68	x		Nibbles, stepping, and grinding
1-1-5	UFUF	Obsidian	4	Straight	54	x		Nibbles, snap fractures, and grinding
1-1-5	BFUF	Obsidian	4	Straight	80		x	Nibbles and stepping
1-1-6	UFUF	Obsidian	3	Convex	76	x		Stepping and grinding
1-1-6	UFUF	Obsidian	3	Concave	61	x		Nibbles and stepping
1-1-7	BFUF	Obsidian	3	Convex	45		x	Nibbles, stepping, and snap fractures
1-1-7	BFUF	Obsidian	3	Convex	80		x	Nibbles and stepping
1-1-8	UFUF	Obsidian	2	Convex	50	x		Nibbles
1-1-8	UFUF	Obsidian	2	Notched	70	x		Nibbles, stepping, and grinding
1-1-9	UFUF	Obsidian	2	Straight	60	x		Nibbles and stepping
1-1-10	FU	Obsidian	2	Concave	75	x		Nibbles and stepping
1-1-10	FU	Obsidian	2	Notched	78	x		Stepping and grinding
1-1-11	UFUF	Obsidian	2	Convex	65	x		Nibbles and stepping
1-1-11	FU	Obsidian	2	Concave	68	x		Nibbles and stepping
1-1-12	FU	Obsidian	2	Straight	70	x		Nibbles and stepping
1-1-13	FU	Obsidian	3	Convex	75	x		Nibbles, stepping, and grinding
1-1-13	FU	Obsidian	3	Concave	70	x		Nibbles, stepping, and grinding
1-1-13	FU	Obsidian	3	Flaked 2 intersecting edges to point	72	x		Stepping
1-1-14	FU	Obsidian	3	Concave	50		x	Nibbles and snap fractures
1-1-14	FU	Obsidian	3	Flaked 2 intersecting edges to point	60	x		Nibbles and stepping
1-1-15	BFUF	Obsidian	4	Straight	50		x	Nibbles, stepping, and snap fractures
1-1-15	BFUF	Obsidian	4	Concave	40		x	Nibbles, stepping, and snap fracures
1-1-15	BFUF	Obsidian	4	Notched	53		x	Nibbles, stepping, and snap fractures

Table B-8 Flaked Stone Tools (continued).

Number				Working Edge		Use Wear		
626-87-n	Type	Material type	Size	Shape	Angle	UFA	BFA	Type
2-S-1	UFUF	Obsidian	2	Concave	85	x		Nibbles and stepping
2-S-1	FU	Obsidian	2	Concave	68	x		Nibbles, stepping, and snap fractures
2-S-1	FU	Obsidian	2	Notched	85	x		Nibbles, stepping, snap fractures, grinding
2-S-2	UFUF	Obsidian	3	Straight	78	x		Nibbles and stepping
2-S-2	UFUF	Obsidian	3	Straight	88	x		Nibbles, stepping, and grinding
2-S-2	BFUF	Obsidian	3	Concave	70		x	Nibbles
2-1-1	PP	Obsidian	4					
2-1-2	PP	Obsidian	2					
2-1-3	PP	Obsidian	2					
2-1-4	PP	Obsidian	1					
2-1-5	PP	Obsidian	2					
2-1-7	UFUF	Obsidian	2	Convex	76	x		Nibbles and stepping
2-1-7	BFUF	Obsidian	2	Convex	63		x	Nibbles, stepping, and snap fractures
2-1-8	UFUF	Obsidian	2	Convex	68	x		Nibbles and stepping
2-1-8	BFUF	Obsidian	2	Convex	70		x	Nibbles, stepping, and grinding
2-1-9	UFUF	Obsidian	2	Concave	85	x		Nibbles, stepping, and snap fractures
2-1-9	BFUF	Obsidian	2	Concave	80		x	Nibbles, stepping, and grinding
2-1-10	BFUF	Obsidian	2	Concave	55		x	Nibbles
2-1-10	FU	Obsidian	2	Double-notched	75		x	Nibbles and stepping
2-1-11	FU	Obsidian	2	Notched	60	x		Nibbles and snap fractures
2-1-12	FU	Obsidian	2	Straight	60		x	Nibbles and stepping
2-1-13	BFUF	Obsidian	3	Straight	82		x	Nibbles, stepping, and snap fractures
2-1-13	BFUF	Obsidian	3	Straight	84		x	Nibbles, stepping, and snap fractures
2-1-14	BFUF	Obsidian	3	Convex	50		x	Nibbles
2-1-15	UFUF	Obsidian	3	Straight	75	x		Nibbles and snap fractures
2-1-16	BFUF	Obsidian	3	Straight	55		x	Nibbles and snap fractures
2-1-17	UFUF	Obsidian	2	Straight	80	x		Nibbles, stepping, and snap fractures
2-1-18	FU	Obsidian	2	Convex	75	x		Nibbles and stepping
2-1-19	BFUF	Obsidian	3	Straight	50		x	Nibbles, stepping, and snap fractures
2-1-20	BFUF	Obsidian	2	Straight	55		x	Nibbles
2-1-20	BFUF	Obsidian	3	Convex	50		x	Nibbles
2-1-21	FU	Obsidian	2	Concave	62	x		Nibbles, stepping, and grinding
2-1-21	FU	Obsidian	2	Flaked 2 intersecting edges to point	69		x	Nibbles and stepping
2-1-21	FU	Obsidian	2	Flaked 2 intersecting edges to point	50	x		Nibbles and snap fractures

Table B-8 Flaked Stone Tools (continued).

Number				Working Edge		Use Wear		
626-87-n	Type	Material type	Size	Shape	Angle	UFA	BFA	Type
3-1-1	PP	Obsidian	2					
3-1-2	FU	Obsidian	2	Straight	50	x		Nibbles and stepping
3-1-3	BF	Obsidian	2					
3-1-4	FU	Obsidian	2	Convex	69	x		Nibbles, stepping, and grinding
3-1-5	FB	Obsidian	2	Flaked 1 of 2 intersecting edges to point	86		x	Nibbles, stepping, and grinding
16-S-1	BF	Petrified wood	3					
16-S-2	FU	Obsidian	3	Straight	64	x		Nibbles, stepping, and grinding
16-S-3	BFUF	Obsidian	2	Straight	58		x	Nibbles and snap fractures
16-S-4	UFUF	Obsidian	2	Concave	76	x		Nibbles, stepping, and grinding
16-S-5	BFUF	Obsidian	2	Convex	55		x	Nibbles and stepping
16-S-5	BFUF	Obsidian	2	Convex	58		x	Nibbles and stepping
16-S-6	PP	Obsidian	2					
4-S-1	BFUF	Basalt	3	Straight	68		x	Nibbles amd rounding/polish
4-S-2	BFUF	Basalt	2	Concave	82		x	Nibbles and rounding/polish
4-S-2	BFUF	Basalt	2	Convex	68		x	Nibbles and rounding/polish
4-S-2	BFUF	Basalt	2	Straight	75		x	Nibbles, snap fractures, rounding/polish
4-1-1	PP	Obsidian	2					
4-1-2	UFUF	Obsidian	2	Convex	65	x		Nibbles and stepping
4-1-3	FU	Obsidian	3	Convex	76		x	Nibbles and stepping
4-1-3	FU	Obsidian	3	Flaked alternate sides 2 edges to point	85		x	Nibbles and stepping
5-1-1	UFUF	Basalt	6	Convex	78	x		Rounding/polish
5-1-1	BFUF	Basalt	6	Double concave	44		x	Rounding/polish
5-1-2	UFUF	Basalt	6	Straight	62	x		Nibbles, stepping, and snap fractures
5-1-2	UFUF	Basalt	6	Convex	38	x		Nibbles, stepping, snap fractures,
5-1-2	UFUF	Basalt	6	Concave	61	x		rounding/polish
						x		Nibbles, stepping, and snap fractures
5-1-3	UFUF	Basalt	6	Concave	56		x	Nibbles, stepping, and grinding
5-1-3	UFUF	Basalt	6	Flaked 1 of 2 intersecting edges to point	80			Nibbles
5-1-4	CR	Obsidian	3					

Table B-8 Flaked Stone Tools (continued).

Number 626-87-n	Type	Material type	Size	Working Edge Shape	Working Edge Angle	Use Wear UFA	Use Wear BFA	Use Wear Type
5-1-5	UFUF	Obsidian	3	Convex	73	x		Nibbles and stepping
5-1-5	FU	Obsidian	3	Notched	48		x	Nibbles, stepping, and grinding
5-1-5	FB	Obsidian	3	Flaked 2 intersecting edges to point	85		x	Nibbles, stepping, and snap fractures
5-1-6	FU	Obsidian	4	Concave	65	x		Nibbles, stepping, and snap fractures
5-1-6	FU	Obsidian	4	Flaked 1 of 2 intersecting edges to point	65		x	Nibbles, stepping, and snap fractures
5-1-7	UFUF	Obsidian	3	Straight	84	x		Nibbles and stepping
5-1-7	FU	Obsidian	3	Concave	58		x	Nibbles, stepping, and grinding
5-1-8	BFUF	Obsidian	2	Convex	70		x	Stepping and snap fractures
5-4-1	UFUF	Basalt	4	Straight	53	x		Nibbles and snap fractures
5-4-2	BFUF	Obsidian	4	Straight	50		x	Nibbles
5-5-1	FU	Obsidian	3	Notched	75		x	Nibbles and stepping
5-5-1	FU	Obsidian	3	Flaked 1 of 2 intersecting edges to point	75	x		Nibbles and stepping
5-5-2	FU	Obsidian	3	Concave	70	x		Nibbles and stepping
5-5-2	FU	Obsidian	3	Flaked 2 intersecting edges to point	75		x	Nibbles, stepping, and snap fractures
5-5-3	UFUF	Basalt	3	Double concave	60	x		Nibbles, snap fractures, rounding/polish
5-5-4	UFUF	Basalt	6	Convex	75	x		Nibbles, stepping, snap fractures, rounding/polish
5-5-4	UFUF	Basalt	6	Straight	60	x		Nibbles, stepping, snap fractures, rounding/polish
5-6-1	UFUF	Obsidian	3	Convex	77	x		Nibbles, stepping, and snap fractures
5-6-1	UFUF	Obsidian	3	Concave	86	x		Nibbles, stepping, snap fractures, and grinding
5-6-2&3	FU	Obsidian	4	Concave	65	x		Nibbles and stepping
5-6-2&3	FU	Obsidian	4	Notched	52	x		Nibbles and stepping
5-6-3	FU	Obsidian	3	Double notched	65	x		Nibbles and stepping
6-3-1	PP	Obsidian	2					
6-4-1	BF	Obsidian	2					Nibbles, stepping, and snap fractures
6-4-2	BFUF	Obsidian	4	Convex	61		x	
6-5-1	UFUF	Obsidian	5	Concave	84	x		Nibbles, stepping, and grinding
6-5-1	FU	Obsidian	5	Convex	65	x		Nibbles and stepping
6-5-1	FU	Obsidian	5	Concave	61	x		Nibbles and stepping
6-6-1	BFUF	Obsidian	4	Concave	87		x	Nibbles, stepping, and grinding
6-6-1	FU	Obsidian	4	Convex	68	x		Nibbles, stepping, snap fractures, and grinding

Table B-8 Flaked Stone Tools (continued).

				Working Edge		Use Wear		
Number 626-87-n	Type	Material type	Size	Shape	Angle	UFA	BFA	Type
7-1-1	BFUF	Obsidian	2	Straight	40		x	Nibbles
7-1-2	UFUF	Obsidian	4	Straight	86	x		Nibbles, stepping, snap fractures, and grinding
7-1-2	FU	Obsidian	4	Concave	75		x	Nibbles, stepping, and grinding
7-1-2	FU	Obsidian	4	Double concave	75	x		Nibbles and stepping
7-1-2	FU	Obsidian	4	Flaked 2 interesecting edges to point	77	x		Nibbles and snap fractures
7-1-3	BFUF	Obsidian	3	Straight	65		x	Nibbles and snap fractures
7-1-3	BFUF	Obsidian	3	Concave	40		x	Nibbles, stepping, and snap fractures
7-1-4	UFUF	Obsidian	2	Straight	65	x		Nibbles, stepping, and grinding
7-1-5	FU	Obsidian	2	Convex	58		x	Nibbles, stepping, and snap fractures
7-1-6	FB	Obsidian	4	Flaked 2 intersecting edges to point	50		x	Nibbles and stepping
7-1-7	UFUF	Obsidian	3	Straight	65	x		Nibbles and stepping
7-1-7	UFUF	Obsidian	3	Concave	70	x		Nibbles and snap fractures
7-1-8	FU	Obsidian	2	Notched	70	x		Nibbles, stepping, and snap fractures
7-1-8	FU	Obsidian	2	Flaked 2 intersecting edges to point	70	x		Nibbles and stepping
7-1-8	FU	Obsidian	2	Flaked 2 intersecting edges to point	75	x		Nibbles, stepping, snap fractures, and grinding
7-1-9	FU	Basalt	4	Convex	43	x		Nibbles and snap fractures
7-1-10	FU	CCS	4	Straight	85	x		Nibbles, stepping, and grinding
7-1-10	FU	CCS	4	Convex	70	x		Nibbles and stepping
7-2-1	BF	Obsidian						
7-2-2	FU	Obsidian	2	Notched	68	x		Nibbles, stepping, and grinding
7-2-3	FU	Obsidian	3	Straight	65	x		Nibbles
7-2-3	FU	Obsidian	3	Concave	64	x		Nibbles and stepping
8-1-1	FU	CCS	5	Convex	70	x		Nibbles, stepping, and snap fractures
8-1-2	FU	Obsidian	3	Double concave	61	x		Nibbles, stepping, and grinding
8-1-3	FU	Obsidian	3	Double notched	65	x		Nibbles, stepping, and grinding
8-1-4	FU	Obsidian	3	Flaked alternate sides 2 edges to point	60		x	Nibbles, stepping, and grinding
8-1-5	UFUF	Obsidian	3	Convex	82	x		Nibbles and snap fractures
8-1-5	CR	Obsidian	3	Concave	57	x		Nibbles and stepping
8-1-6	UFUF	Obsidian	2	Convex	65	x		Nibbles
8-1-6	UFUF	Obsidian	2	Straight	48		x	Nibbles and snap fractures
8-1-7	FU	Obsidian	2	Concave	58	x		Nibbles and stepping
8-1-8	UFUF	Obsidian	2	Convex	62	x		Nibbles and stepping
8-1-9	UFUF	Obsidian	3	Straight	85	x		Nibbles, stepping, and grinding
8-1-9	BFUF	Obsidian	3	Concave	65		x	Nibbles and stepping
8-1-10	UFUF	Obsidian	2	Straight	67	x		Nibbles and stepping
8-1-11	FU	Obsidian	2	Concave	63	x		Nibbles, stepping, and snap fractures
8-1-12	FU	Obsidian	2	Straight	66	x		Nibbles, stepping, and grinding

Table B-8 Flaked Stone Tools (continued).

Number 626-87-n	Type	Material type	Size	Working Edge		Use Wear		
				Shape	Angle	UFA	BFA	Type
8-1-13	FB	Obsidian	3	Flaked 2 interescting edges to point				
8-1-14	UFUF	Obsidian	3	Concave	72	x		Nibbles, stepping, and grinding
8-1-14	UFUF	Obsidian	3	Concave	85	x		Nibbles, stepping, and snap fractures
8-1-15	FU	Obsidian	3	Straight	87	x		Nibbles and stepping
8-1-15	FU	Obsidian	3	Notched	57	x		Nibbles and stepping
8-1-16	FB	Obsidian	3					
8-1-17	FU	Obsidian	3	Convex	70	x		Nibbles, stepping, and grinding
8-1-18	BFUF	Obsidian	3	Convex	60		x	Nibbles, stepping, and snap fractures
8-1-18	FU	Obsidian	3	Concave	75	x		Nibbles and stepping
8-1-19	UFUF	Obsidian	2	Straight	65	x		Nibbles and stepping
8-1-19	UFUF	Obsidian	2	Straight	70	x		Nibbles, stepping, and grinding
8-1-20	FU	Obsidian	2	Flaked alternate sides 2 edges to point	55	x		Nibbles and snap fractures
8-1-21	UFUF	Obsidian	4	Convex	62	x		Nibbles and stepping
8-1-21	UFUF	Obsidian	4	Concave	56	x		Nibbles, stepping, and snap fractures
8-1-22	FU	Basalt	5	Double concave	67	x		Nibbles, stepping, and grinding
8-1-24	BFUF	Basalt	3	Convex	58		x	Nibbles, stepping, and snap fractures
8-2-1	PP	Obsidian	2					
8-2-2	FU	Obsidian	3	Straight	70	x		Nibbles, stepping, and snap fractures
8-2-2	FU	Obsidian	3	Straight	80		x	Nibbles, stepping, and grinding
8-2-2	FU	Obsidian	3	Convex	70	x		Nibbles, stepping, and grinding
8-2-4	BFUF	Obsidian	3	Convex	58		x	Nibbles, stepping, snap fractures
8-2-6	BFUF	Obsidian	3	Convex	52		x	Nibbles, stepping, snap fractures
8-2-7	UFUF	Basalt	8	Concave	48	x		Nibbles and snap fractures
8-2-8	FU	Obsidian	4	Concave	68		x	Nibbles, stepping, and snap fractures
8-2-8	FU	Obsidian	4	Straight	70		x	Nibbles, stepping, and snap fractures
8-2-8	FU	Obsidian	4	Flaked 2 interescting edges to point	68		x	Nibbles
8-2-9	FU	Obsidian	2	Flaked 1 of 2 intersecting edges to point	65		x	Nibbles and snap fractures
8-2-9	FU	Obsidian	2	Notched	70	x		Nibbles and stepping
8-2-11	FU	Obsidian	3	Concave	73	x		Nibbles, steppping, and grinding
8-2-11	FU	Obsidian	3	Concave	68		x	Nibbles, stepping, and snap fractures
8-2-12	FU	Obsidian	2	Convex	74	x		Nibbles, stepping, and grinding
8-2-13	FU	CCS	4	Straight	77	x		Nibbles, stepping, and snap fractures
8-2-15	PP	Obsidian	2					
8-2-16	BF	Obsidian	2					
8-2-17	PP	Obsidian	2					
8-2-18	UFUF	Obsidian	2	Concave	55	x		Nibbles and stepping

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Table B-8 Flaked Stone Tools (continued).

Number				Working Edge		Use Wear		
626-87-n	Type	Material type	Size	Shape	Angle	UFA	BFA	Type
8-2-19	FU	Obsidian	3	Concave	66	x		Nibbles, stepping, and grinding
8-2-19	FU	Obsidian	3	Concave	70	x		Nibbles, stepping, and grinding
8-2-19	FB	Obsidian	3	Flaked 2 intersecting edges to point	74	x		Nibbles and stepping
8-2-20	BFUF	Obsidian	2	Straight	52		x	Nibbles and snap fractures
8-2-20	UFUF	Obsidian	2	Straight	61		x	Nibbles and snap fractures
8-2-21	UFUF	Obsidian	3	Convex	72	x		Nibbles, stepping, and grinding
8-2-21	FU	Obsidian	3	Convex	66	x		Nibbles
8-2-22	FU	Obsidian	3	Notched	72	x		Nibbles, stepping, and grinding
8-2-23	FU	CCS	3	Straight	61	x		Nibbles, stepping, and snap fractures
8-2-24	UFUF	Petrified wood	2	Straight	75	x		Nibbles and stepping
8-3-1	PP	Obsidian	2					
8-3-2	UFUF	Obsidian	2	Straight	83	x		Nibbles, stepping, snap fractures, grinding
8-3-2	UFUF	Obsidian	2	Straight	84	x		Nibbles, stepping, and grinding
8-3-3	UFUF	Obsidian	2	Straight	85	x		Nibbles and stepping
8-3-3	UFUF	Obsidian	2	Straight	86	x		Nibbles and stepping
8-3-4	UFUF	Obsidian	2	Concave	66	x		Nibbles and stepping
8-3-4	FU	Obsidian	2	Convex	84	x		Nibbles and stepping
8-3-5	FU	Obsidian	2	Straight	62		x	Nibbles, stepping, and snap fractures
8-3-5	FU	Obsidian	2	Convex	88	x		Nibbles, stepping, and grinding
8-3-5	FU	Obsidian	2	Flaked 1 of 2 intersecting edges to point	85	x		Nibbles and stepping
9-S-1	BF	Obsidian	2					
9-1-2	UFUF	Basalt	3	Notched	68	x		Nibbles and stepping
9-1-2	FU	Basalt	3	Convex	72	x		Nibbles and stepping
9-1-2	FU	Basalt	3	Flaked 2 intersecting edges to point	73	x		Nibbles and stepping
9-1-3	UFUF	Basalt	4	Straight	45	x		Snap fractures
9-1-4	FB	Obsidian	4	Straight	48		x	Nibbles and stepping
9-1-5	UFUF	Obsidian	4	Straight	66	x		Nibbles
9-1-5	FU	Obsidian	4	Convex	80	x		Nibbles and snap fractures
9-1-6	UFUF	Obsidian	2	Straight	65	x		Nibbles and stepping
9-1-6	UFUF	Obsidian	2	Concave	62	x		Nibbles, stepping, and snap fractures
9-1-7	UFUF	Obsidian	3	Straight	62	x		Nibbles
9-1-8	FU	Obsidian	3	Concave	70	x		Nibbles, stepping, and grinding
9-1-8	FU	Obsidian	3	Notched	88	x		Nibbles and snap fractures
9-1-8	FU	Obsidian	3	Flaked 2 intersecting edges to point	58		x	Nibbles and stepping
9-1-9	PP	Obsidian	2					
9-1-10	PP	Obsidian	2					

Table B-8 Flaked Stone Tools (continued).

Number 626-87-n	Type	Material type	Size	Working Edge		Use Wear		
				Shape	Angle	UFA	BFA	Type
9-1-11	BF	Obsidian	2					
9-1-12	FU	Obsidian	3	Concave	70	x		Nibbles and stepping
9-1-12	FB	Obsidian	3	Notched	75		x	Stepping
9-1-12	FB	Obsidian	3	Flaked 2 intersecting edges to point	60		x	Nibbles and stepping
9-1-12	FB	Obsidian	3	Flaked 2 intersecting edges to point	80		x	Nibbles, stepping, and grinding
9-1-13	UFUF	Obsidian	2	Concave	68	x		Nibbles
9-1-14	UFUF	Obsidian	2	Straight	63	x		Nibbles and stepping
9-1-14	FU	Obsidian	2	Flaked 2 intersecting edges to point	52	x		Nibbles
9-1-15	FU	Obsidian	3	Concave	64	x		Nibbles and stepping
9-1-16	FU	Obsidian	3	Straight	76	x		Nibbles, stepping, and grinding
9-1-16	FU	Obsidian	3	Notched	75	x		Nibbles, stepping, and grinding
9-1-16	FU	Obsidian	3	Flaked 2 intersecting edges to point	69		x	Nibbles and stepping
9-1-16	FU	Obsidian	3	Flaked alternate sides 2 edges to point	64		x	Nibbles, snap fractues, and grinding
9-1-17	UFUF	Obsidian	2	Straight	55	x		Nibbles
9-1-17	UFUF	Obsidian	2	Straight	86	x		Nibbles and stepping
9-1-18	BF	Obsidian	2					
9-1-19	FU	Obsidian	2	Convex	60		x	Nibbles and stepping
9-1-20	UFUF	Obsidian	2	Concave	84	x		Nibbles and stepping
9-1-20	BFUF	Obsidian	2	Convex	72		x	Nibbles, stepping, and snap fractures
9-1-20	FU	Obsidian	2	Convex	80	x		Nibbles, stepping, snap fractures, and grinding
9-1-21	FU	Obsidian	2	Concave	68	x		Nibbles, stepping, and grinding
9-1-21	FU	Obsidian	2	Concave	80	x		Nibbles, stepping, and grinding
9-1-22	UFUF	Obsidian	3	Straight	60	x		Nibbles
9-1-22	UFUF	Obsidian	3	Straight	67	x		Nibbles
9-1-23	UFUF	Obsidian	3	Straight	81	x		Nibbles, stepping, and grinding
9-1-23	FU	Obsidian	3	Convex	68	x		Nibbles, stepping, and grinding
9-1-24	UFUF	Basalt	2	Convex	58	x		Nibbles, stepping, and snap fractures
9-2-1	PP	Obsidian	2					
9-2-2	UFUF	Petrified wood	3	Concave	88	x		Nibbles, and snap fractures
9-2-2	BFUF	Petrified wood	3	Straight	65		x	Nibbles, stepping, and snap fractures
9-2-3	BFUF	Obsidian	3	Concave	40		x	Nibbles, stepping, and snap fractures
9-2-3	FU	Obsidian	3	Straight	54		x	Nibbles and snap fractures
9-2-3	FU	Obsidian	3	Convex	55	x		Nibbles, stepping, and snap fractures
9-2-3	FU	Obsidian	3	Concave	60	x		Nibbles, stepping, and snap fractures
9-2-4	BF	Obsidian	3					
9-2-5	PP	Obsidian	2					
9-2-6	FU	Obsidian	2	Straight	70	x		Nibbles, stepping, and snap grinding

Table B-8 Flaked Stone Tools (continued).

Number				Working Edge		Use Wear		
626-87-n	Type	Material type	Size	Shape	Angle	UFA	BFA	Type
9-2-7	UFUF	Obsidian	3	Concave	70	x		Nibbles and stepping
9-2-7	FU	Obsidian	3	Flaked alternate sides 2 edges to point	75		x	Nibbles, stepping, and snap fractures
9-2-8	FU	Obsidian	3	Convex	64		x	Nibbles, stepping, and snap fractures
9-2-9	BFUF	Obsidian	4	Notched	62		x	Nibbles, stepping, and snap fractures
9-2-9	FU	Obsidian	4	Concave	72	x		Nibbles, stepping, and grinding
9-2-9	FU	Obsidian	4	Flaked 2 intersecting edges to point	55		x	Nibbles and snap fractures
9-2-10	BFUF	Obsidian	5	Straight	55		x	Nibbles, stepping, and snap fractures
9-2-11	PP	Obsidian	4					
9-2-12	UFUF	Obsidian	3	Straight	84	x		Nibbles and stepping
9-2-13	PP	Obsidian	3					
9-2-14	CR	Obsidian	3					
9-2-15	FU	Obsidian	4	Double notched	80	x		Nibbles, stepping, and grinding
9-2-16	BF	Obsidian	4					
9-2-17	UFUF	CCS	3	Concave	81	x		Stepping and grinding
9-2-18	BFUF	Obsidian	3	Concave	82		x	Nibbles and stepping
9-2-18	FU	Obsidian	3	Straight	63		x	Nibbles, stepping, and grinding
9-2-18	FU	Obsidian	3	Notched	68	x		Nibbles and stepping
9-2-18	FB	Obsidian	3	Flaked alternate sides 2 edges to point	56		x	Nibbles
9-2-19	BFUF	Basalt	5	Convex	53		x	Nibbles and stepping
9-2-20	UFUF	Basalt	4	Straight	61	x		Nibbles and stepping
9-2-20	UFUF	Basalt	4	Straight	76	x		Nibbles and stepping
9-2-20	UFUF	Basalt	4	Convex	66	x		Nibbles and snap fractures
9-2-21	FU	Obsidian	4	Straight	75	x		Stepping and grinding
9-2-21	FU	Obsidian	4	Convex	65	x		Nibbles, snap fractures, and grinding
9-2-21	FU	Obsidian	4	Double notched	70		x	Stepping and grinding
9-2-21	FU	Obsidian	4	Flaked 2 intersecting edges to point	63		x	Nibbles and snap fractures
9-2-22	FU	Obsidian	6	Convex	55		x	Nibbles, stepping, and snap fractures
9-2-22	FU	Obsidian	6	Convex	72	x		Nibbles, stepping, and snap fractures
9-2-22	FU	Obsidian	6	Concave	68	x		Nibbles, stepping, and grinding
9-2-22	FU	Obsidian	6	Notched	58	x		Nibbles and snap fractures
9-2-23	UFUF	Obsidian	3	Straight	88	x		Nibbles and stepping
9-2-23	UFUF	Obsidian	3	Convex	68	x		Nibbles and stepping
9-2-23	UFUF	Obsidian	3	Notched	82	x		Stepping and grinding
9-2-24	FU	CCS	5	Straight	73	x		Nibbles and stepping
9-2-24	FU	CCS	5	Concave	76	x		Nibbles and stepping
9-2-24	FB	CCS	5	Flaked 2 intersecting edges to point	74		x	Nibbles and stepping
9-2-25	FU	Obsidian	3	Double notched	69		x	Nibbles, stepping, and grinding
9-2-26	PP	Obsidian	2					

Table B-8 Flaked Stone Tools (continued).

Number 626-87-n	Type	Material type	Size	Working Edge		Use Wear		
				Shape	Angle	UFA	BFA	Type
9-2-27	PP	Obsidian	1					
9-2-28	PP	Obsidian	2					
9-2-29	BFUF	Obsidian	3	Straight	42		x	Nibbles and snap fractures
9-2-30	FU	Obsidian	2	Convex	68	x		Nibbles, stepping, and snap fractures
9-2-31	BF	Obsidian	2					
9-2-32	UFUF	Basalt	5	Concave	74	x		Nibbles
9-3-1	UFUF	CCS	4	Convex	60	x		Nibbles and snap fractures
9-3-2	FU	Obsidian	3	Convex	69	x		Nibbles and stepping
9-3-2	FU	Obsidian	3	Concave	71	x		Nibbles, stepping, and snap fractures
10-S-1	UFUF	Basalt	6	Straight	58	x		Nibbles and snap fractures
10-S-1	UFUF	Basalt	6	Concave	58	x		Rounding/polish
10-S-2	BFUF	Basalt	5	Concave	65		x	Nibbles and snap fractures
10-2-3	BF	Obsidian	3					
10-1-1	UFUF	Obsidian	3	Concave	74	x		Nibbles, stepping, and grinding
10-1-1	UFUF	Obsidian	3	Concave	88	x		Nibbles, stepping, and grinding
10-1-1	FU	Obsidian	3	Straight	76	x		Nibbles, stepping, and grinding
10-1-1	FU	Obsidian	3	Straight	78	x		Nibbles, stepping, and grinding
10-1-2	UFUF	Obsidian	3	Straight	78	x		Nibbles and stepping
10-1-2	FU	Obsidian	3	Notched	72	x		Nibbles, stepping, and snap fractures
10-3-1	BF	Obsidian	4					
S-1	CR	Obsidian	3					
S-4	BF	Obsidian	3					
S-5	BFUF	Petrified wood	3	Convex	73		x	Nibbles, stepping, and grinding
S-5	FU	Petrified wood	3	Double concave	88	x		Nibbles and stepping
S-5	FU	Petrified wood	3	Flaked 2 intersecting edges to point	85		x	Stepping
S-6	UFUF	Petrified wood	3	Straight	86	x		Nibbles, stepping, and snap fractures
S-7	UFUF	CCS	3	Convex	82	x		Nibbles
S-8								
S-9	PP	Obsidian	3					
S-10	PP	Obsidian	2					
S-11								
S-12	UFUF	Petrified wood	3	Straight	89	x		Stepping
S-16	FU	Petrified wood	2	Concave	85	x		Nibbles, stepping, and grinding
S-17	UFUF	CCS	5	Straight	60	x		Nibbles
S-17	UFUF	CCS	5	Convex	80	x		Nibbles and stepping

Table B-8 Flaked Stone Tools (continued).

Number 626-87-n	Type	Material type	Size	Working Edge		Use Wear		
				Shape	Angle	UFA	BFA	Type
S-18	UFUF	CCS	3	Convex	85	x		Nibbles
S-18	UFUF	CCS	3	Concave	80	x		Nibbles and stepping
S-19	BF	Obsidian	3					
S-21	FU	Obsidian	3	Flaked 2 alternate sides to point	68	x		Nibbles and stepping
S-21	UFUF	Obsidian	3	Straight	82	x		Nibbles, stepping, and grinding
S-21	UFUF	Obsidian	3	Concave	75	x		Nibbles, stepping, and grinding
S-26	FU	Basalt	7	Convex	72	x		Nibbles, stepping, and rounding/polish
S-27	PP	Obsidian	2					
S-34	BF	Obsidian	5					
S-36	BF	Obsidian	3					
S-40	BF	Obsidian	4					
S-41	PP	Obsidian	2					
S-42	PP	Obsidian	2					
S-43	BF	Obsidian	4					
S-44	CR	Obsidian	3					
S-45	FU	Obsidian	3	Notched	74	x		Stepping and grinding
S-46	FU	Petrified wood	3	Convex	75	x		Nibbles, stepping, and grinding
S-47	BF	Obsidian	3					
S-48	UFUF	Petrified wood	3	Convex	76	x		Nibbles, stepping, and grinding
S-49	FU	Basalt	10	Straight	67		x	Snap fractures and rounding/polish
S-51	BF	CCS	6					
S-52	UFUF	Obsidian	4	Notched	88	x		Stepping, snap fractures, and grinding
S-52	UFUF	Obsidian	4	Straight	40		x	Nibbles and snap fractures
S-54	PP	Obsidian	2					
S-68	UFUF	Basalt	8	Straight	72	x		Nibbles and rounding/polish
S-68	FU	Basalt	8	Convex	68		x	Nibbles, stepping, and rounding/polish
S-78	BF	Obsidian	2					
JB-1	PP	CCS	6					
MKM-1	PP	Obsidian	3					

APPENDIX C: WILDHORSE AND BARNES VALLEY TIMBER SALES
CULTURAL RESOURCE INVENTORY REPORT

INTRODUCTION AND PROJECT SETTING

As part of the 1986 University of Oregon Archaeological Field School, a Phase 1 cultural resource inventory of two proposed USDI Bureau of Land Management timber sales was conducted. These two sale areas, the Barnes Valley and the Wildhorse Timber Sales, are in the uplands 1–3 mi east and southeast of Gerber Reservoir (Figure C-1). Both proposed timber sale areas have undergone previous logging.

The Wildhorse Timber Sale encompasses a timbered area interspersed with sagebrush flats on low hills at the end of Horse Camp Rim. Wildhorse Creek, a seasonal stream, drains the area. The survey area is open and easily reached. Elevations range from 4980 to 5368 ft amsl (above mean sea level).

Barnes Valley Creek Timber Sale is in a timbered drainage. Barnes Valley Creek is a perennial water source and the area along and upslope from the creek is timbered with ponderosa pine and juniper. Above the creek valley is a flat sagebrush scabland. Elevations range from about 4920 to about 5275 ft amsl.

METHODS

The survey was conducted from 30 June to 15 July 1986. The 5-person survey crew was accompanied by BLM Lakeview District Archaeologist William J. Cannon on some days, especially during the survey's first days.

The survey focused on timbered areas (Figure C-1), and generally involved coverage of areas with ponderosa pine or juniper by a 2–5 member crew walking transects spaced 20–30 m apart. When smaller 2–3 person crews were used they kept in contact by means of hand-held radios.

Generally transects followed a straight compass direction. Because of the steep ground within the proposed Barnes Valley Timber Sale area, transects following the contour of the land were also used. Near creeks, transect direction meandered to parallel the direction of the creek. At the edge of timbered areas at least one person walked along the forest/sagebrush flat interface and one person walked the sagebrush flat parallel to and 20 m from the interface. To reach isolated stands of timber, the sagebrush flat between timber stands was also surveyed.

When a cultural item was found, the survey crew halted and examined the general area more intensively. Each such location was given a letter designation, a "B" for Barnes Valley Timber Sale or a "W" for Wildhorse Timber Sale, followed by a unique site number in sequence beginning with "1" for the first location where a cultural item was found in a

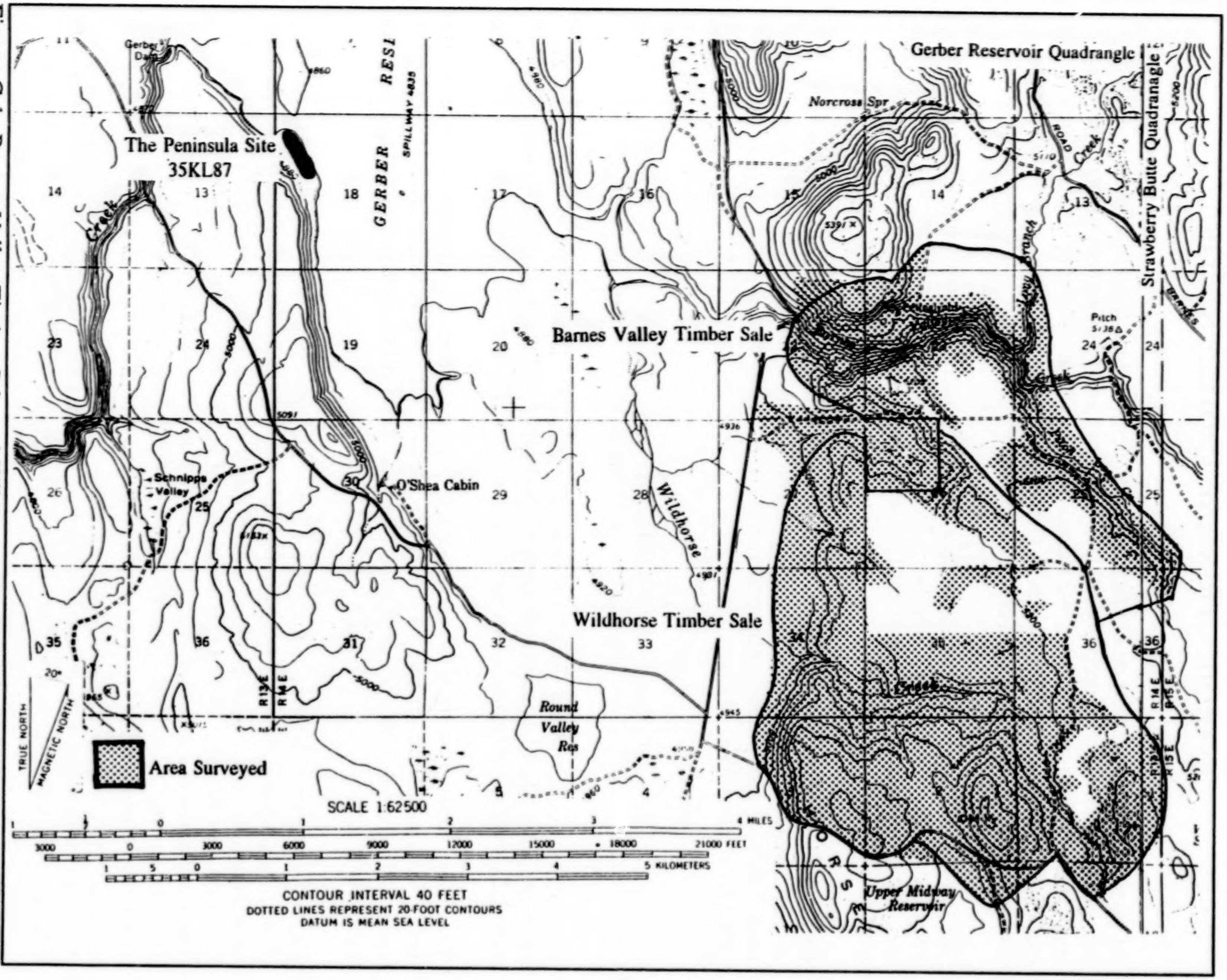

Figure C-1. Barnes Valley Timber Sale and Wildhorse Timber Sale Survey Areas.

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particular timber sale. When two small crews were used on the same day, one crew was given the odd numbers to use and the other the even numbers. This practice led to some number not being assigned.

An Oregon Archaeological Survey site form from the University of Oregon's Museum of Natural History was filled out for each location where a cultural item was found. Each location was also marked on either the 1960 Gerber Reservoir 15 minute USGS quadrangle map or the 1960 Strawberry Butte 15 minute USGS quadrangle map.

Artifacts, such as complete projectile points, were collected when they were thought to be susceptible to illegal collection. References to collected specimens are made according to a the labeling system developed for the Peninsula Site analysis. The first part is the Oregon State Museum of Anthropology accession number for the site collection: "626." The second component indicates the appropriate timber sale: "B" or "W." The third component indicates the unique site number. Where more than one artifact was collected from a site, a fourth designation is also used, a unique specimen number in sequence beginning with "1."

In preparing this survey report site locations were transferred to the provisional 1988 USGS 7.5 minute quadrangle maps for the area. In addition, for cases in which a cultural item had been given a discrete field number but was within 50 m of another location where other cultural items had been given another discrete field number, the locations were combined and reported on one form.

Sites were divided into three categories based on the number of observed artifacts: isolates with only one artifact, isolated lithic scatters with from two to nine artifacts, and lithic scatters with ten or more observed artifacts. In addition, rock features, such as piles of stones or a rock wall, as well as historical features, such as a developed spring or an irrigation headgate, were also recorded.

RESULTS

In all, 18 lithic scatter sites, 31 isolated lithic scatters, and 55 isolates were discovered. In addition, two rock features, one in association with an isolated lithic scatter, and a historic developed spring in association with a lithic scatter were also found (Figures C-2 and C-3). Modern and possibly historical debris was also found in association with a lithic scatter. The cultural resources found during the timber sale surveys are listed in Table C-1.

Forty two isolates consisted of a single obsidian flake. Other isolates include obsidian cores (Sites B-20, W-30, W-40, and W-48), biface fragments (Sites B-10, W-2, and W-49), and projectile points (Sites W-39, W-55, and W-90); basalt cores (Site B-9 and W-11); and a CCS flake (Site W-73). Similarly, most of the isolated lithic scatters consisted of from two

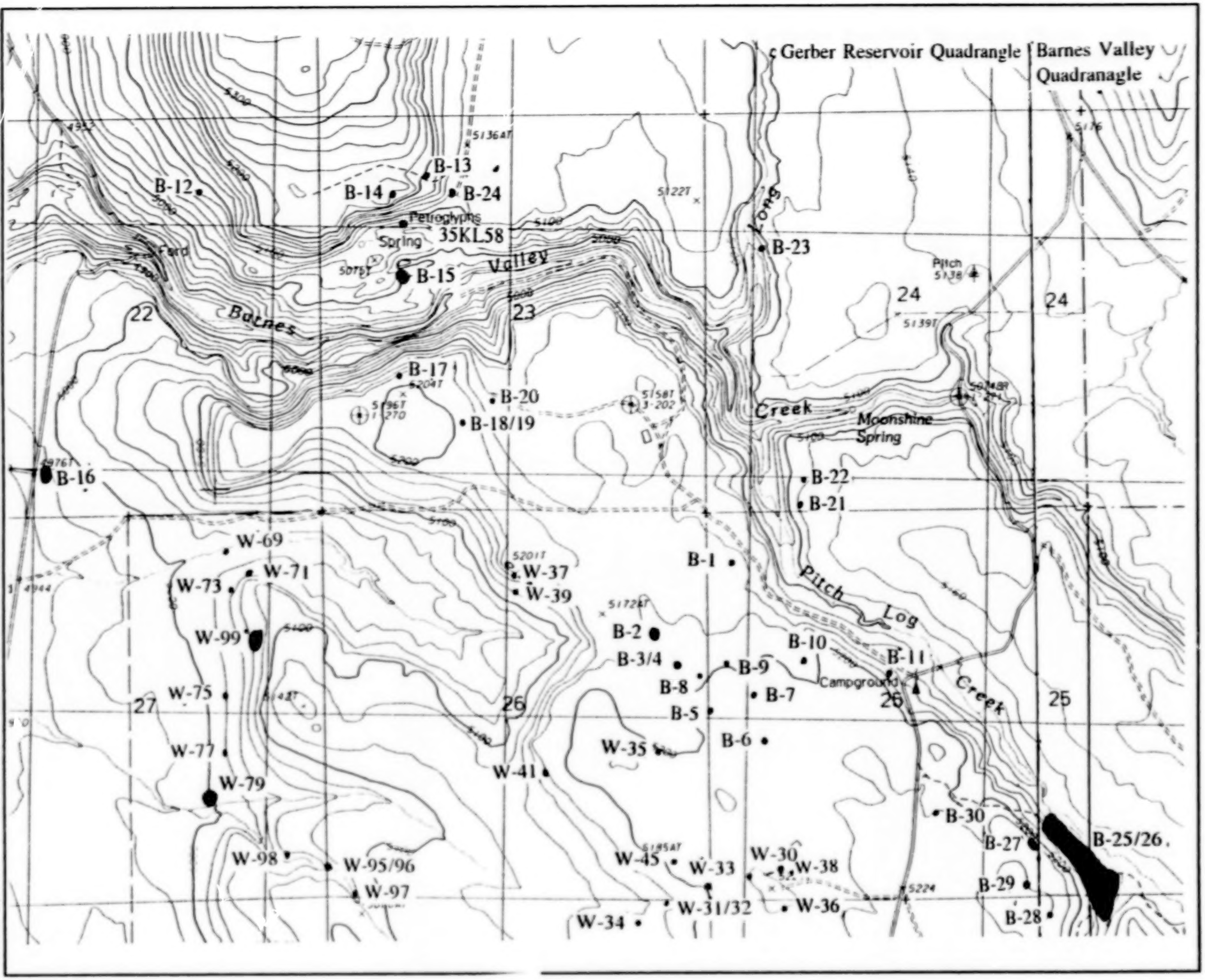

Figure C-2 Cultural Resources Discovered in the Barnes Valley Timber Sale and Wildhorse Timber Sale Survey Areas, Northern Map.

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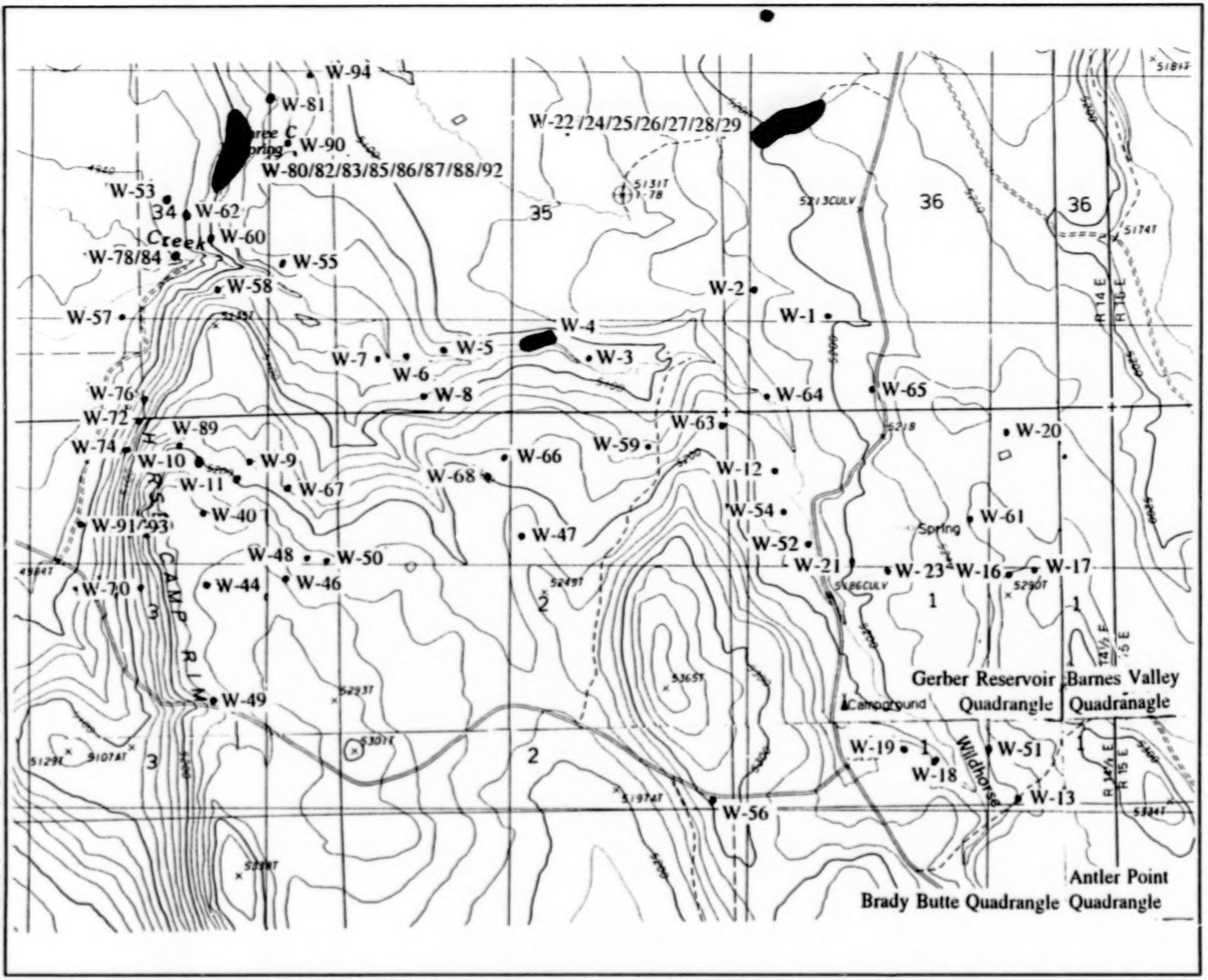

Figure C-3 Cultural Resources Discovered in the Barnes Valley Timber Sale and Wildhorse Timber Sale Survey Areas, Southern Map.

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Table C-1 Cultural Resources Found During the Barnes Valley Timber Sale and the Wildhorse Timber Sale Surveys.

Field number[1]	Site type[2]	Description and comments
B-1	LS	One obsidian flake
B-2	LS	More than 30 obsidian and basalt flakes, an obsidian core, a CCS core; may be part of Site B-3/4
B-3/4	LS	Fifteen obsidian, basalt, and CCS flakes
B-5	ISO	More than 15 obsidian flakes
B-6	ISO	Obsidian flake
B-7	ISO	Obsidian flake
B-8	ISO	Obsidian flake
B-9	ISO	Basalt core
B-10	ISO	Obsidian biface fragment
B-11	ISO	Obsidian flake
B-12	ILS	Five obsidian flakes
B-13	ISO	Obsidian flake
B-14	ILS	Two obsidian flakes
B-15	LS	Twenty five obsidian flakes
B-16	LS	More than 75 obsidian flakes and one projectile point base
B-17	ISO	Obsidian flake
B-18/19	ILS	Four obsidian flakes
B-20	ISO	Obsidian core
B-21	ISO	Five obsidian flakes
B-22	ILS	Obsidian flake
B-23	ILS	Obsidian flake and obsidian core
B-24	ILS	Two obsidian flakes and one obsidian nodule
B-25/26	HS?	Prehistoric: more than 200 obsidian, basalt, and CCS flakes; numerous biface fragments; projectile points; two unifacially worked obsidian flakes (possible triangular, concave base points) Historical/modern: brown, green, and clear bottle glass fragments (all appear to be of automatic machine manufacture); tin cans; milled lumber; three ceramic refined earthenware fragments possibly from a cup (three pieces fit together)
B-27	LS	More than 100 obsidian and CCS flakes
B-28	ILS	Two obsidian flakes and two petrified wood flakes
B-29	ILS	Seven obsidian flakes
B-30	ILS	One obsidian flake, one obsidian uniface, and one CCS core
W-1	ILS	Two obsidian flakes, obsidian biface fragment, and an obsidian projectile point base
W-2	ISO	Obsidian biface fragment
W-3	ILS	One obsidian flake and an obsidian core
W-4	LS	Thirty obsidian, CCS, and basalt flakes
W-5	LS	Fifteen obsidian flakes
W-6	LS	Three artifact clusters; tools: retouched CCS flake, basalt scraper, used obsidian flake, obsidian flake uniface, obsidian projectile point
W-7	ILS	Three obsidian flakes
W-8	ILS	Three obsidian flakes
W-9	ILS	Obsidian flake and an obsidian projectile point

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Table C-1 Cultural Resources Found During the Barnes Valley Timber Sale and the Wildhorse Timber Sale Surveys (continued).

Field number[1]	Site type[2]	Description and comments
W-10	LS	More than 100 obsidian flakes; biface fragments, core, used flake, projectile point
W-11	ISO	Basalt core
W-12	LS	Twelve obsidian flakes, obsidian core, and an obsidian projectile point base
W-13	ISO	Obsidian flake
W-14	ILS	Three obsidian flakes and an obsidian core
W-16	ISO	Obsidian flake
W-17	ISO	Obsidian flake
W-18	ISO	Obsidian flake
W-19	ISO	Obsidian flakes
W-20	ISO	Obsidian flake
W-21	ISO	Obsidian flake
W-22/24/25/26/27/28/29	LS	Ten obsidian flakes and one basalt flake
W-23	ISO	Obsidian flake
W-30	ISO	Obsidian core
W-31/32	ILS	Three obsidian flakes
W-33	ISO	Obsidian flake
W-34	ILS	Three obsidian flakes and one obsidian projectile point
W-35	ISO	Obsidian flake
W-36	ISO	Obsidian flake
W-37	ISO	Obsidian flake
W-38	ISO	Obsidian flake
W-39	ISO	Obsidian projectile point
W-40	ISO	Obsidian core (nodule with one flake removed)
W-41	ILS	Two obsidian flakes and one used obsidian flake
W-44	ISO	Obsidian flake
W-45	ILS	Three obsidian flakes
W-46	RF	Two rock piles
W-47	ISO	Obsidian flake
W-48	ISO	Obsidian core
W-49	ISO	Obsidian biface fragment
W-50	ISO	Obsidian flake
W-51	ILS	Two obsidian flakes and one basalt flake
W-52	ISO	Obsidian flake
W-53	LS	More than 20 obsidian, CCS, and basalt flakes
W-54	ILS	Obsidian flake and one obsidian projectile point
W-55	ISO	Obsidian projectile point
W-56	ISO	Obsidian flake
W-57	ISO	Obsidian flake
W-58	ILS	Five obsidian flakes
W-59	ISO	Obsidian flake
W-60	ILS, RF	Two obsidian flakes and a rock wall
W-61	ISO	Obsidian flake

Table C-i Cultural Resources Found During the Barnes Valley Timber Sale and the Wildhorse Timber Sale Surveys (continued).

Field number[1]	Site type[2]	Description and comments
W-62	LS	More than 100 obsidian, CCS, and basalt flakes; one metate
W-63	ISO	Obsidian flake
W-64	ISO	Obsidian flake
W-65	ISO	Obsidian flake
W-66	ISO	Obsidian flake
W-67	ISO	Obsidian flake
W-68	ISO	Obsidian flake
W-69	ISO	Obsidian flake
W-70	ISO	Obsidian biface
W-71	ISO	Obsidian flake
W-72	ILS	Three obsidian flakes and one obsidian biface fragment
W-73	ISO	CCS flake
W-74	ILS	Two obsidian flakes
W-75	ILS	Two obsidian flakes and an obsidian biface tip
W-76	ISO	Obsidian flake
W-77	ISO	Obsidian flake
W-78/84	ILS, HF	Two obsidian cores and Irrigation Headgate
W-79	LS	More than 50 obsidian and CCS flakes, some basalt and petrified wood flakes, a CCS core, an obsidian biface, and an obsidian uniface
W-80/82/83/85/86/87/88/92	LS, HF	More than 100 obsidian, CCS, basalt and petrified wood flakes near a historical CCC developed spring
W-81	LS	Six obsidian, three CCS, and two basalt flakes and one obsidian projectile point fragment
W-89	ISO	Obsidian flake
W-90	ISO	Obsidian projectile point
W-91	ILS	Two obsidian flakes and one CCS flake
W-93	ISO	Obsidian flake
W-94	ILS	Two obsidian flakes
W-95/96	ILS	Three obsidian flakes
W-97	ISO	Obsidian flake
W-98	ILS	Two obsidian flakes
W-99	LS	More than 150 obsidian, CCS, and basalt flakes; two projectile points and one projectile point fragment

[1] Field numbers not listed were not used.

[2] ISO = Isolate, only one artifact; ILS = Isolated lithic scatter, 2-9 artifacts; LS = Lithic scatter, 10 or more artifacts; RF = Rock feature; HF = Historic feature; HS? = Possible historical artifact scatter.

to five obsidian flakes. Four consisted of from one to three obsidian flakes and an obsidian core (Sites B-23, B-24, W-3, and W-14), two were an obsidian flake and an obsidian projectile point (Sites W-9 and W-54), two were obsidian flakes and an obsidian biface fragment (Sites W-72 and W-73), one was two obsidian cores (Site W-78), one was two obsidian and two petrified wood flakes (Site B-28), one was two obsidian flakes and one CCS flake (Site W-91), and one was two obsidian flakes and one basalt flake (Site W-51).

Lithic scatters varied in their composition (Table C-2). Observed average artifact densities for all lithic scatters were less than one artifact per square meter of site surface area. However, discrete, denser artifact concentrations were found within Sites B-2, B-3/4, B-5, B-16, B-25/26, W-6, W-22/24/25/26/27/28/29, and W-80/82/83/85/86/87/88. In terms of artifact frequency, only eight sites contained more than 50 observed artifacts: Sites B-16, B-25/26, B-27, W-10, W-62, W-79, W-80/82/83/85/86/87/88/92, and W-99. Site W-62 is unique among the lithic scatters in that a metate fragment was found.

Most of the lithic scatters are close to a water source (Figure C-4). Site W-80/82/83/85/86/87/88/92 is at Three C Spring along the base of the slope leading up to the rim rock on the west side of the survey area. Site W-81 is about 125 m northeast of Site W-80/82/83/85/86/87/88/92 and may be part of that site. Sites W-53 and W-62, both southwest of Three C Spring, are within about 100 m of Wildhorse Creek. These two sites are about 125 m from each other and may actually be part of the same site.

Site W-79 is along a tributary of Wildhorse Creek along the base of the slope leading up to the rim rock on the west side of the survey area. Sites W-4, W-5, and W-6, in close proximity to each other, are along portions of Wildhorse Creek above the rim rock. Site W-12 is farther upstream and about 75 m west of the creek.

Site B-15 is on the slopes north of Barnes Valley Creek about 150 m southwest of a spring and 175 m south of the petroglyphs recorded as Site 35KL58. Site B-25/26 is in the eastern part of the survey area at the confluence of Pitch Log Creek and an unnamed tributary. Site B-27 is at the top of the slope above Site B-25/26, about 150 m from Pitch Log Creek.

No nearby water source is apparent for several sites, including Site B-16 which lies on relatively flat ground in the extreme western part of the survey area, about 800 m south of Barnes Valley Creek and 400 m north of a tributary of Wildhorse Creek; Site W-99,in the western part of the survey area on the slope leading up to the rim rock; Site W-10,on the plateau just east of Horse Camp Rim; Site W-22/24/25/26/27/28/29, at an island of timber on the plateau above the rim rock; and Sites B-2, B-3/4, and B-5, on the plateau south of Barnes Valley Creek and west of Pitch Log Creek. These last three sites are in relatively close proximity to each other in an area where ipos grows.

Two rock features were also found. Site W-46 consisted of two lichen-covered rock piles: four small rocks less than 20 cm in diameter piled on the east end of a large boulder and seven rocks, the largest of which is 20 x 30 cm, piled on bedrock 2.5 m from the first pile. Site W-60 consisted of a partially collapsed, 1.5 m long rock wall, 3 or 4 rocks high, composed of rocks averaging 1 ft in diameter. Two obsidian flakes were found about 4 m southeast of this wall.

Table C-2 Lithic Scatters and Rock Features Found During the Barnes Valley Timber Sale and the Wildhorse Timber Sale Surveys.

Site[1]	Lithic Scatter	Ground Stone	Rock Features	Size	Comments
B-2	yes	no	no	2,500 m^2	
B-3/4	yes	no	no	252 m^2	
B-5	yes	no	no	210 m^2	
B-15	yes	no	no	2,000 m^2	
B-16	yes	no	no	2,400 m^2	
B-25/26	yes	no	no	20,000 m^2	Multiple loci, possible historical artifacts
B-27	yes	no	no	1,950 m^2	
W-4	yes	no	no	5,000 m^2	
W-5	yes	no	no	500 m^2	
W-6	yes	no	no	1,000 m^2	
W-10	yes	no	yes	5,000 m^2	Two rock piles
W-12	yes	no	no	825 m^2	
W-22+[3]	yes	no	no	30,000 m^2	Low density scatter
W-46	no	no	yes	10 m^2	1.5 m long rock wall (hunting blind?), two obsidian flakes
W-53	yes	no	no	750 m^2	
W-60	no[2]	no	yes	7 m^2	
W-62	yes	yes	no	450 m^2	
W-79	yes	no	no	2,500 m^2	
W-80+[4]	yes	no	no	24,000 m^2	Low density scatter with multiple loci
W-81	yes	no	no	700 m^2	
W-99	yes	no	no	1,800 m^2	

[1] Sites with numbers beginning with a "B" were found within the proposed Barnes Valley Timber Sale and those beginning with a "W" were found within the proposed Wildhorse Timber Sale.

[2] Two obsidian flakes were observed at Site W-60, too few to classify it as a lithic scatter.

[3] Site W-22+ includes Sites W-22, W-24, W-25, W-26, W-27, W-28, and W-29.

[4] Site W-80+ includes Sites W-80, W-82, W-83, W-85, W-86, W-87, W-88 and W-92.

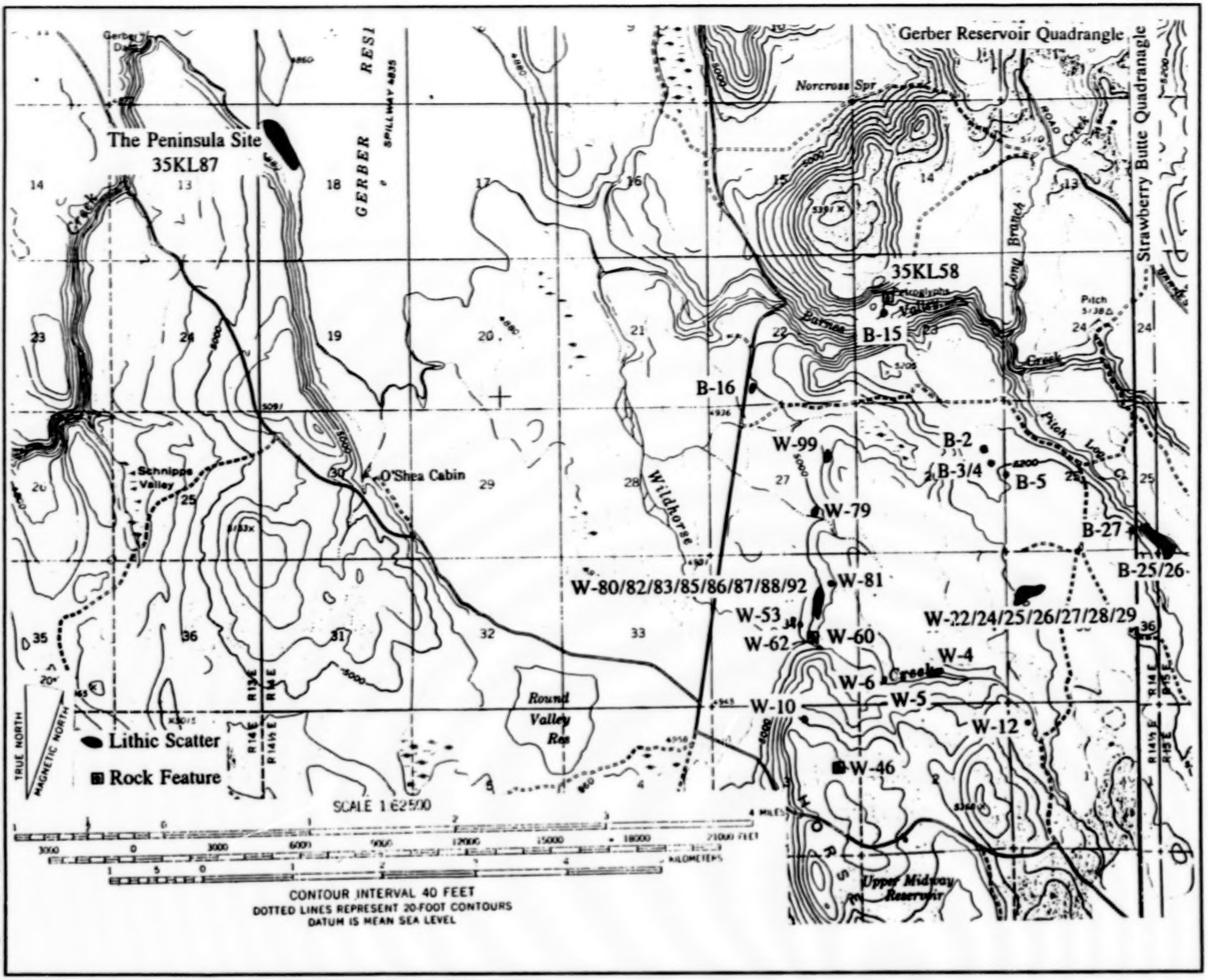

Figure C-4 Lithic Scatter and Rock Feature Sites Discovered in the Barnes Valley Timber Sale and Wildhorse Timber Sale Survey Areas.

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APPENDIX D:

OBSIDIAN ANALYSES REPORTS,

BIOSYSTEMS ANALYSIS, INC.

BIOSYSTEMS ANALYSIS INC.

REPORT OF X-RAY FLUORESCENCE ANALYSIS AND OBSIDIAN HYDRATION RIM MEASUREMENT OF ARTIFACT OBSIDIAN FROM 35KL87

Thomas L. Jackson,
M. Kathleen Davis,
and Jay H. King

May 11, 1993

Thirty-two pieces of artifact obsidian from site 35KL87, located in south-central Oregon, were submitted for determination of the geological source of the raw material using energy dispersive X-ray fluorescence trace-element analysis. These samples were also submitted for hydration rind measurement.

X-RAY FLUORESCENCE METHODS

Analyses were completed using a Spectrace 5000 energy dispersive X-ray fluorescence system. The system is equipped with a Si(Li) detector with a resolution of 155 eV FHWM for 5.9keV X-rays (at 1000 counts per second) in an area $30mm^2$. Signals from the spectrometer are amplified and filtered by a time variant pulse processor and sent to a 100 MHz Wilkinson type analog-to-digital converter. The X-ray tube employed is a Bremsstrahlung type, with a rhodium target, and 5 mil Be window. The tube is driven by a 50 kV 1 mA high voltage power supply, providing a voltage range of 6 to 50 kV.

For analysis of the elements zinc (Zn), gallium (Ga), lead (Pb), thorium (Th), rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr), and niobium (Nb), the X-ray tube is operated at 30 kV, .30 mA (pulsed), with a .127 mm Pd filter. Analytical lines used are: Zn (K-alpha), Ga (K-alpha), Pb (L-alpha), Th (L-alpha), Rb (K-alpha), Sr (K-alpha), Y (K-alpha), Zr (K-alpha) and Nb (K-alpha). Scanning period is 200 seconds live-time in an air path. Trace-element intensities for the Zn-Nb series elements are converted to parts-per-million (ppm) by weight using a least squares polynomial fit routine. Ppm values may vary according to specimen mass and nature of the surface of the sample. For the analysis of the elements iron (Fe), and manganese (Mn), the X-ray tube is operated at 15kV, .14 mA with a .127 mm aluminum filter. Scanning period is 300 seconds live-time in an air path. Iron and manganese values are reported as a ratio of the iron K-alpha peak to the manganese K-alpha peak. All samples are scanned as unmodified rock specimens (not powder).

X-RAY FLUORESCENCE RESULTS

Analytical results are given in the following table. Of thirty-two specimens submitted, seventeen are characteristic of the Drews Creek/Butcher Flat chemical group. Other sources represented in the sample include Spodue Mountain (seven specimems), Blue Mountain (two specimens), Grasshopper Flat (one specimen), Witham Creek (one specimen), Cougar Butte (one specimen), and Buck Mountain (one specimen). The concentration of rubidium in specimen 1-1-16-3 is slightly higher than that normally observed in Drews Creek/Butcher Flat obsidian, thus the specimen is designated Drews Creek/Butcher Flat?. All other elements, including the iron/manganese ratio, are in agreement with known values for this obsidian. Specimen 1-1-16-4 belongs to an unidentified chemical group and is designated Unknown.

BioSystems Analysis, Inc.
XRF LABORATORY CATALOGUE

PROJECT NAME: Peninsula Site

ACCESSION DATA			TRACE-ELEMENT CONCENTRATION VALUES (ppm)									
lab#	catalog#		Zn	Pb	Rb	Sr	Y	Zr	Nb	Ba	Fe/Mn ratio	SOURCE
			32.1	20.8	145.6	102.6	26.2	218.7	11.3		69.0	RGM-1 Reference Standard
		+/-	4.7	2.2	1.7	7.1	1.3	5.6	1.3			
			37.4	22.6	148.8	102.3	25.3	217.0	9.8			RGM-1 Reference Standard
		+/-	4.3	1.9	1.7	7.1	1.3	5.6	1.3			
35KL87												
1	1-2-1-1		42.2	29.4	132.8	23.5	21.5	94.8	11.1		17.2	Drews Creek/Butcher Flat
		+/-	5.8	2.8	2.3	7.1	1.7	5.7	1.9			
2	1-2-1-2		44.1	20.4	117.4	46.9	25.7	137.0	17.7			Spodue Mountain
		+/-	4.6	2.1	1.7	7.1	1.4	5.5	1.4			
3	1-2-1-3		36.4	29.4	129.1	18.6	25.9	95.1	16.1		16.3	Drews Creek/Butcher Flat
		+/-	4.8	2.3	1.8	7.1	1.4	5.6	1.5			
4	1-2-1-4		37.9	19.3	125.4	10.2	26.0	90.7	15.0		15.4	Drews Creek/Butcher Flat
		+/-	4.7	2.2	1.8	7.0	1.4	5.5	1.5			
5	2-2-29-1		81.1	36.6	167.3	2.6	69.0	163.1	22.0			Cougar Butte
		+/-	4.6	2.4	1.9	7.0	1.5	5.5	1.4			
6	2-2-29-2		37.1	27.8	124.1	22.3	20.6	92.8	14.0		16.5	Drews Creek/Butcher Flat
		+/-	4.7	2.2	1.9	7.1	1.5	5.6	1.5			
7	2-2-29-3		42.3	22.8	115.8	16.6	22.6	100.3	13.4		22.0	Drews Creek/Butcher Flat
		+/-	5.3	2.5	2.0	7.1	1.5	5.6	1.7			
8	2-2-29-4		34.3	26.4	132.9	21.5	19.4	96.8	14.1		16.0	Drews Creek/Butcher Flat
		+/-	4.9	2.2	1.9	7.1	1.5	5.6	1.6			
9	8-3-6-1		200.2	44.3	219.0	2.1	101.7	1108.6	100.6			Witham Creek
		+/-	5.7	2.4	2.2	7.0	1.7	6.5	1.7			
10	8-3-6-2		184.0	18.0	68.0	1.4	78.3	396.8	16.0			Blue Mountain
		+/-	5.7	2.2	1.6	7.0	1.6	5.8	1.6			
11	8-3-6-3		54.9	22.3	124.6	49.9	26.1	136.3	17.3			Spodue Mountain
		+/-	4.7	2.1	1.8	7.1	1.5	5.6	1.5			

Cont.

ACCESSION DATA			TRACE-ELEMENT CONCENTRATION VALUES (ppm)									
lab#	catalog#		Zn	Pb	Rb	Sr	Y	Zr	Nb	Ba	Fe/Mn ratio	SOURCE
35KL87												
12	8-3-6-4		42.3	23.7	123.8	15.3	25.2	111.9	15.9		21.1	Drews Creek/Butcher Flat
		+/-	4.6	2.1	1.8	7.1	1.4	5.6	1.5			
13	9-3-3-1		44.8	22.1	128.5	11.5	27.4	94.1	16.1		15.1	Drews Creek/Butcher Flat
		+/-	4.2	1.9	1.7	7.0	1.3	5.5	1.4			
14	9-3-3-2		53.0	17.9	112.4	49.1	26.1	133.7	15.7			Spodue Mountain
		+/-	4.5	2.0	1.7	7.1	1.4	5.5	1.4			
15	9-3-3-3		41.4	23.9	157.2	81.1	33.1	222.5	8.8			Grasshopper Flat
		+/-	4.6	2.4	2.0	7.1	1.5	5.7	1.6			
16	9-3-3-4		42.2	18.0	106.6	43.5	22.4	125.8	14.4			Spodue Mountain
		+/-	5.1	2.4	1.8	7.1	1.4	5.6	1.5			
17	1-1-16-1		42.1	23.9	129.3	9.6	26.2	94.0	9.7			Drews Creek/Butcher Flat
		+/-	4.7	2.2	1.8	7.0	1.4	5.5	1.5			
18	1-1-16-2		33.5	21.1	117.4	17.2	18.9	92.4	11.1			Drews Creek/Butcher Flat
		+/-	5.4	2.6	2.0	7.1	1.6	5.6	1.7			
19	1-1-16-3		49.6	25.2	145.4	11.8	31.5	96.3	16.0		16.5	Drews Creek/Butcher Flat?
		+/-	4.9	2.2	2.0	7.1	1.5	5.6	1.6			
20	1-1-16-4		68.8	30.9	162.4	2.9	39.2	226.7	42.1		36.8	Unknown
		+/-	4.9	2.3	2.1	7.0	1.5	5.6	1.5			
21	2-1-22-1		42.6	25.4	114.0	16.8	24.5	106.8	13.7			Drews Creek/Butcher Flat
		+/-	5.1	2.4	1.9	7.1	1.5	5.6	1.6			
22	2-1-22-2		37.5	21.3	112.7	66.5	16.1	104.2	13.7			Buck Mountain
		+/-	5.2	2.3	1.9	7.1	1.5	5.6	1.6			
23	2-1-22-3		45.9	17.9	101.8	44.0	22.6	119.9	14.3			Spodue Mountain
		+/-	4.7	2.1	1.8	7.1	1.4	5.6	1.5			
24	2-1-22-4		55.1	26.7	139.1	10.6	28.9	96.5	11.5			Drews Creek/Butcher Flat
		+/-	4.8	2.3	2.1	7.1	1.5	5.6	1.7			
25	8-1-25-1		47.1	17.4	109.1	42.1	22.1	126.2	14.5			Spodue Mountain
		+/-	5.0	2.3	1.8	7.1	1.4	5.6	1.5			
26	8-1-25-2		39.8	16.7	105.0	39.5	22.7	120.9	11.6			Spodue Mountain
		+/-	4.8	2.1	1.7	7.1	1.4	5.6	1.5			
27	8-1-25-3		162.1	17.6	63.7	2.3	69.6	380.5	19.5			Blue Mountain
		+/-	5.4	2.0	1.5	7.0	1.5	5.7	1.4			

Cont.

ACCESSION DATA			TRACE-ELEMENT CONCENTRATION VALUES (ppm)									
lab#	catalog#		Zn	Pb	Rb	Sr	Y	Zr	Nb	Ba	Fe/Mn ratio	SOURCE
35KL87												
28	8-1-25-4		42.2	21.3	136.0	11.4	29.6	93.4	13.8			Drews Creek/Butcher Flat
		+/-	4.5	2.0	1.8	7.0	1.4	5.5	1.4			
29	9-1-25-1		43.1	23.3	124.0	10.6	29.4	92.1	12.9			Drews Creek/Butcher Flat
		+/-	4.6	2.2	1.9	7.0	1.5	5.6	1.6			
30	9-1-25-2		40.6	20.3	109.3	22.0	23.2	100.7	14.6			Drews Creek/Butcher Flat
		+/-	5.1	2.3	1.9	7.1	1.5	5.6	1.6			
31	9-1-25-3		46.2	22.3	132.3	8.8	26.0	93.3	15.0			Drews Creek/Butcher Flat
		+/-	4.6	2.2	1.9	7.0	1.5	5.6	1.5			
32	9-1-25-4		45.6	21.1	124.1	8.4	29.6	91.1	13.5			Drews Creek/Butcher Flat
		+/-	4.9	2.3	1.9	7.1	1.5	5.6	1.6			

OBSIDIAN HYDRATION METHODS

Selected obsidian artifacts (n=32) recovered from archaeological site 35KL87 were subjected to obsidian hydration analysis during the months of April and May 1993. The prepared specimen slides are curated at BioSystems Analysis, Inc., Santa Cruz, California, under specimen accession number BO-93-19.

During the initial phase of obsidian hydration specimen preparation, an appropriate section of each artifact is selected for examination. The location of this section is determined by the morphology and the perceived potential of the location for yielding a maximum amount of archaeological data concerning the manufacture, use, and discard of an artifact. Two parallel cuts are made into the edge of each specimen, using a 0.12 mm-thick, diamond impregnated, lapidary saw blade, powered by a motor turning at approximately 3600 rpm. These cuts isolate a wedge which is approximately one millimeter thick. The wedge is then removed from the artifact and the freshly cut, exposed faces of the wedge are manually ground in a slurry of 600 grade, optical-quality corundum abrasive on flat plate glass. Initial grinding of the wedge is designed to reduce the thickness of the wedge by approximately one half and remove saw nicks from the faces of the artifact potentially containing an hydration layer. The obsidian wedge is then affixed to a microscope specimen slide with thermoplastic cement, ground to a final thickness of 30-50 microns, and protected with a coverslip. The end product is a thin cross-section of the outer faces of the artifact.

The prepared slide is mounted on an Olympus BHT custom petrographic microscope fitted with cross-polarizing filters and gypsum quarter wave filter. The filters maximize the visual contrast between the hydrated layer and non-hydrated glass, providing valuable confirmation that no optical aberration is being construed as hydration. The edge of the obsidian thin-section is scanned under a magnification of either 500X, 750X, or 1250X. The measurement magnification is generally selected with regard to the opacity of the obsidian and the size of the hydration rind. Narrow rinds (i.e., those under approximately 2.0 microns) are usually examined under a magnification of 750X or 1250X, which produce larger images. Hydration rinds smaller than one micron often cannot be detected by optical magnification, although hydration may be present.

When a clearly defined hydration band is identified, the section is centered in the optical field to minimize the parallax effect that might be manifested with the filar screw micrometer eyepiece. This eyepiece is used to measure the thickness of the hydration band to the nearest 0.1 micron. A maximum of eight readings are taken (up to four each from two sides of the artifact thin-section).

Resulting values are entered into a Paradox 3.5 computer program designed to calculate the mean and standard deviation for each edge of the specimen. The program then discriminates the difference between the two sides and determines whether the two values (sets of micron readings) represent the same or different hydration thicknesses.

OBSIDIAN HYDRATION RESULTS

Obsidian hydration data are presented in the following catalogue. Hydration thicknesses are reported to the nearest 0.1 micron. Standard deviation figures represent the variation for hydration thickness measurements recorded for each specimen. They do not reflect the resolution limitations associated with the optical microscope, generally accepted as no smaller than 0.2 microns.

ABBREVIATIONS AND DEFINITIONS USED IN THE "COMMENTS" COLUMN

DFV - (Diffusion Front Vague). The diffusion front, or the visual boundary between hydrated and unhydrated portions of the specimen, are poorly defined. This can result in less precise measurements than can be obtained from sharply demarcated diffusion fronts. The technician must often estimate the hydration boundary because a vague diffusion front often appears as a relatively thick, dark line or a gradation in color or brightness between hydrated and unhydrated layers.

DIS - (DIScontinuous). A discontinuous or interrupted hydration rind was observed on the thin section.

HV - (Highly Variable). The hydration rind exhibits variable thickness along continuous surfaces. This variability can occur with very well- defined bands as well as those with irregular or vague diffusion fronts.

IRR - (IRRegular). The surfaces of the thin section (the outer surfaces of the artifact) are uneven and measurement is difficult.

1SO - (1 Surface Only). Hydration was observed on only one surface or side of the thin section.

NVH - (No Visible Hydration). No hydration rind was observed. This does not mean that hydration is absent, only that hydration was not observed. Hydration rinds smaller than one micron often are not birefringent and thus cannot be seen by optical microscopy.

UNR - (UNReadable). The optical quality of the hydration rind is so poor that accurate measurement is not possible. Poor thin section preparation is not a cause.

NOT - (NOT obsidian). Petrographic characteristics of the artifact or obsidian specimen indicate that the specimen is not obsidian, rendering hydration analysis unfeasible.

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PAGE

BioSystems Analysis, Inc.
OBSIDIAN HYDRATION CATALOGUE

ACCESSION NO. : BO-93-19

PROJECT NAME: Peninsula Site
CLIENT: Jon M. Silvermoon AFFILIATION:
NUMBER OF SPECIMENS: 32 DATE SUBMITTED: March 22, 1993

35KL87

ACCESSION DATA		PROVENIENCE		DESCRIPTION		HYDRATION (microns)			COMMENTS (see text)	OBSIDIAN SOURCE
ohl#	catalog#	unit	depth(cm)	name	type	band 1	band 2	band 3		
1	1-2-1-1	23.5N/1.5E	10-20	Debitage		3.7 +- 0.3				Drews Creek/Butcher Flat (x)
2	1-2-1-2	23.5N/1.5E	10-20	Debitage		2.9 +- 0.3				Spodue Mountain (x)
3	1-2-1-3	23.5N/1.5E	10-20	Debitage		3.1 +- 0.3				Drews Creek/Butcher Flat (x)
4	1-2-1-4	23.5N/1.5E	10-20	Debitage		3.3 +- 0.3				Drews Creek/Butcher Flat (x)
5	2-2-29-1	23.5N/2.0E	10-20	Debitage		3.5 +- 0.3				Cougar Butte (x)
6	2-2-29-2	23.5N/2.0E	10-20	Debitage		3.6 +- 0.3				Drews Creek/Butcher Flat (x)
7	2-2-29-3	23.5N/2.0E	10-20	Debitage		3.4 +- 0.3				Drews Creek/Butcher Flat (x)
8	2-2-29-4	23.5N/2.0E	10-20	Debitage		3.4 +- 0.3				Drews Creek/Butcher Flat (x)
9	8-3-6-1	195S/260E	20-30	Debitage		3.2 +- 0.3				Witham Creek (x)
10	8-3-6-2	195S/260E	20-30	Debitage		1.5 +- 0.3				Blue Mountain (x)
11	8-3-6-3	195S/260E	20-30	Debitage		2.2 +- 0.3				Spodue Mountain (x)
12	8-3-6-4	195S/260E	20-30	Debitage		3.6 +- 0.3				Drews Creek/Butcher Flat (x)
13	9-3-3-1	197S/260E	20-30	Debitage		3.7 +- 0.3				Drews Creek/Butcher Flat (x)
14	9-3-3-2	197S/260E	20-30	Debitage		3.4 +- 0.3				Spodue Mountain (x)
15	9-3-3-3	197S/260E	20-30	Debitage		3.3 +- 0.3	17.9 +- 0.3			Grasshopper Flat (x)
16	9-3-3-4	197S/260E	20-30	Debitage		3.5 +- 0.3	5.0 +- 0.3			Spodue Mountain (x)
17	1-1-16-1	23.5N/1.5E	0-10	Debitage		5.2 +- 0.3	7.1 +- 0.3			Drews Creek/Butcher Flat (x)
18	1-1-16-2	23.5N/1.5E	0-10	Debitage		3.7 +- 0.3				Drews Creek/Butcher Flat (x)
19	1-1-16-3	23.5N/1.5E	0-10	Debitage		4.5 +- 0.3				Drews Creek/Butcher Flat? (x)
20	1-1-16-4	23.5N/1.5E	0-10	Debitage		5.9 +- 0.3				Unknown (x)
21	2-1-22-1	23.5N/2.0E	0-10	Debitage		3.9 +- 0.3				Drews Creek/Butcher Flat (x)
22	2-1-22-2	23.5N/2.0E	0-10	Debitage		3.0 +- 0.3				Buck Mountain (x)
23	2-1-22-3	23.5N/2.0E	0-10	Debitage		4.4 +- 0.3				Spodue Mountain (x)
24	2-1-22-4	23.5N/2.0E	0-10	Debitage		4.2 +- 0.3	6.6 +- 0.3			Drews Creek/Butcher Flat (x)
25	8-1-25-1	195S/260E	0-10	Debitage					NVH	Spodue Mountain (x)
26	8-1-25-2	195S/260E	0-10	Debitage		2.7 +- 0.3				Spodue Mountain (x)
27	8-1-25-3	195S/260E	0-10	Debitage					NVH	Blue Mountain (x)
28	8-1-25-4	195S/260E	0-10	Debitage		3.7 +- 0.3				Drews Creek/Butcher Flat (x)
29	9-1-25-1	197S/260E	0-10	Debitage					NVH	Drews Creek/Butcher Flat (x)
30	9-1-25-2	197S/260E	0-10	Debitage		3.1 +- 0.3				Drews Creek/Butcher Flat (x)
31	9-1-25-3	197S/260E	0-10	Debitage					DFV UNR	Drews Creek/Butcher Flat (x)
32	9-1-25-4	197S/260E	0-10	Debitage		7.0 +- 0.3				Drews Creek/Butcher Flat (x)

APPENDIX E: SAMPLE REPORT FORM - FINAL REPORT, RADIOCARBON DATING LABORATORY, WASHINGTON STATE UNIVERSITY

Washington
State University

Department of Chemical Engineering, Pullman, Washington 99164-2710 / 509-335-4332

RADIOCARBON DATING LABORATORY

WASHINGTON STATE UNIVERSITY
Pullman, Washington, 99164-2710
Office: (509) 335-4731
Lab: (509) 335-2417

SAMPLE REPORT FORM - FINAL REPORT

NAME OF SUBMITTER	DATE RECEIVED
Carla Burnside	October 15, 1987
DATE REPORTED	WSU ACCOUNT NUMBER
January 15, 1988	15L 3813 1002 #28

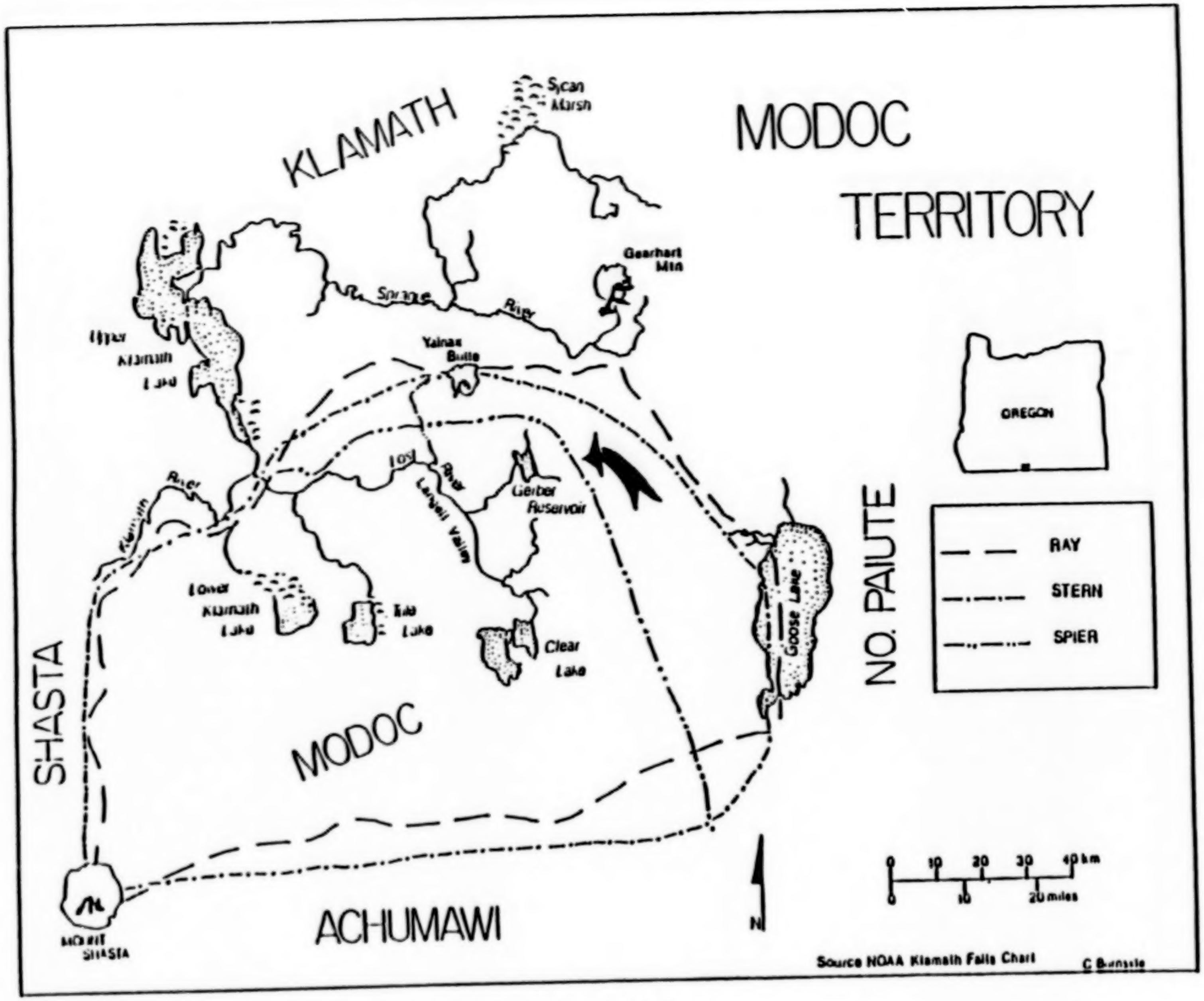
WSU SAMPLE NUMBER	YOUR SAMPLE NUMBER	^{14}C AGE, YEARS B.P.
3695	#1 Frog Hollow	R% 102.32 ± 1.08 (MODERN)
3696	#2 35KL87	R% 103.1 ± 1.42 (MODERN)
3697	#3 Frog Hollow	1190 ± 90
3698	#4 35KL87	540 ± 90
3699	#5 35LK87	1080 ± 70

Sample Processed by: Welter
Sample Calculated by: Welter/Sheppard
Sample Reported by: Sheppard

NOTE: All analyses are based upon the Libby half-life (5570 ± 30 years) for radiocarbon. To convert ages to the half-life of 5730 years, multiply the age given above by 1.03. Zero age date is A.D. 1950. (Reference: Editorial Comment, RADIOCARBON, Vol. 7, 1965.)

APPENDIX F: ARCHAEOLOGICAL SURVEY AND EXCAVATIONS IN THE GERBER RESERVOIR QUADRANGLE, SUMMER 1987

By Carla D. Burnside



Source NOAA Klamath Falls Chart

C Burnside

MAP 1

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PREFACE AND ACKNOWLEDGMENTS

Archaeological investigations in the Gerber Reservoir region were conducted under a cooperative agreement between the Bureau of Land Management and the Univerisity of Oregon Department of Anthropology. Fieldwork was conducted by the department archaeological field schoolfrom June through August 1987. Special thanks goes to Bill Cannon of the Lakeview BLM for his direction and input. Carla D. Burnside was in charge of field work, assisted by Wyndeth Moisan. The field crew was composed of students in the Archaeological fieldschool: Lynn Boone, Jennifer Graham, Michael Jones, Maria Opie, and Michael Walker. Gretchen Luoma, a Student Conservation Corps Volunteer, also spent a considerable amount of time on our crew. Dr. C. Melvin Aikens was responsible for coordination of the project at the University of Oregon. Thanks also to Steve Sherman of the Klamath Falls BLM for his support, and for providing information relevent to the project.

Special gratitude goes to Edward and Marilyn Livingston for their continued hospitality and interest in our work.

INTRODUCTION: THE RESEARCH PROBLEM

Ethnographic information (Ray 1963, Stern 1966) indicates that the Modoc people native to the Klamath Basin followed a transhumant pattern of movement during the spring, summer, and fall. Summertime movements took the Modoc into upland areas above 4000 ft., where they were able to procure food resources not available at lower elevations. Many of these foods were collected and stored for use in the winter months.

Although Ray (1963:180-181) implies that the Modoc did not occupy settled villages in the summer, he does say that they would inhabit a summer camp for as long as possible. Ray does not go into much detail about the nature of these summer camps, saying only that they were located in proximaty to important resources, especially water.

Archaeological research in the Gerber Reservoir Quadrangle is oriented toward understanding the numerous prehistoric occupation sites (indicated by stone rings) found in this upland reach of traditional Modoc territory. Many of these sites are surrounded by a wide variety of resources (eg. the Peninsula Site, and the Frog Hollow Site, reported here). Water appears to have been locally available from creeks or springs at most of the known sites. Since this upland is snowy and cold in the winter, in contrast to milder conditions in nearby lowlands, the area was most probably occupied during the warmer seasons of the year.

The Research outlined here is designed to explore the hypothesis that the stone ring sites found in the area represent summertime settlements, which were, in the late prehistoric period, more permanent than Ray implies for the ethnographic Modoc. It appears that these sites were occupied for quite lengthy sojurns while a wide variety of resources, available nearby at different times, during late spring, summer, and early fall, were collected and processed.

PART I: AN INTRODUCTION TO THE ABORIGINAL CULTURES OF THE GERBER RESEARCH AREA

The following ethnographic summary is reproduced, in part, from a Masters' Paper presented to the University of Oregon Department of Anthropology, June 1987 (Burnside 1987).

LOCATION AND ENVIRONMENT OF THE MODOC

The Klamath and Modoc country lay at the boundaries of three differing cultural areas: Northern California, the Plateau, and the Great Basin. Although the Klamath-Modoc were fundamentally influenced by the Great Basin cultures (Stern 1966:4), they were also in contact with California and Plateau groups. Jorgensen (1980) presents a statistical assessment of their close affinities to each of these cultural areas. The inland lake environment and its associated patterns set the Klamath and Modoc apart from other groups who exhibited slightly different cultural emphases (Barrett 1910:259). The Klamath and Modoc displayed a significant degree of specialization to their lacustrine habitats (Barrett 1910:260). The Modoc were, however, somewhat less fully focused on lakemarsh adaptation than were the Klamath.

Within their territory the Modoc were made up of three main groups: those living from Lower Klamath lake to Tule lake; those clustered on the lower Lost River; and a third group with settlements as far to the east as Goose Lake (Stern 1966:19).

Ray (1963:xi) best describes the location and environment of the Modoc:

> "The Modoc Indians lived on both sides of what is now the California - Oregon boundary, immediately east of the Cascade Range of mountains. Their world was one of extravagant geographic diversity. Even within the bounds of their small tribal territory they looked upon perpetually snow-covered peaks and active volcanoes on the west, vast forests of Ponderosa pine on the north, barren alkali flats on the east, and near-virgin fields on the south. Numerous large lakes and thousands of acres of marshland were scattered over the plains of sagebrush and juniper. Isolated hills and minor mountain ranges created numerous drainage systems but all of the streams were relatively small. The greatest of these, the Klamath River, traversed only the northwestern portion of Modoc territory.

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> Lost River was the stream of second order - "lost" because it rises in Clear Lake and flows into Tule Lake, which has no outlet." (See Map 1)

Modoc villages were primarily located at Lower Klamath, Tule, and Clear Lakes, as well as upon Lost River (Stern 1966:5).

SIMILARITIES AND DIFFERENCES BETWEEN SUBSISTENCE AND SETTLEMENT SYSTEMS OF THE ETHNOGRAPHIC MODOC AND KLAMATH

The Modoc lived in close proximity to the Klamath and many similarities can be found between the two peoples. The common usage of water-lily seeds (wokas) for subsistence by both tribes, as well as the use of fibrous materials (tule, cattail, and sagebrush bark) for clothing can be attributed to the particular environment that they both inhabited. Semi-subterranean earth lodges were also common to both tribes. The Modoc tended to excavate deeper lodges than the Klamath (Stern 1966:7).

Economic differences of interest to the current research distinguish the Modoc from the Klamath. The Modoc placed more emphasis upon hunting than did the Klamath, who stressed fishing. Using the bow and arrow, as well as dogs, the Modoc would go out in small parties of co-villagers to hunt (Stern 1966:14). A greater emphasis on and retention of hunting may be the result of less influence by northern fishing people (Stern 1966:4-5), although environmental factors are no doubt also involved. The Modoc also placed more emphasis upon the gathering of wild seeds, utilizing beaters, conical baskets, and mats that were similar to those of the Great Basin cultures (Stern 1966:5,14).

ANNUAL SUBSISTENCE CYCLE OF THE MODOC

Ray (1963:180) reports that the annual cycle of economic activites was highly formalized in terms of resources and the knowledge and skills of the people. According to him, "rigid adherence to the schedule was necessary not only for the sake of social conformity but also for physical survival."

The Role of Fishing

Dismantling of the winter houses at the permanent villages (in order to dry them out) occurred as soon as the snow melted, usually in March. The first movement of the new year was to early spring fishing sites along the rivers. For three weeks or a month, the men devoted all of their energies to catching fish (Ray 1963:181). A wide variety of fish were caught --black, silver-sided, and speckled trout; buffalo-fish, and large suckers (Powers 1877:256). Salmon were absent in the Modoc territory. The first sucker-fishing season was in March and lasted for a short time. Trout then appeared. By late summmer the trout were mostly gone, but the sucker run was at its height. Trout appeared again in December. The Modoc also caught chubs, minnows, and eels, and collected fresh water shellfish (Ray 1963:192-193).

Triangular dip nets were used to take suckers. A small gill-net of fine string was used for smaller fish (Barrett 1910:249-250). Funnel traps woven of willows were used in stream rapids to capture fish. Suckers and trout were also obtained with two-pronged and multipronged spears. Chubs, minnows, trout and eel were taken with hooks and gorgets (Ray 1963:194-195). Canoes and rafts were employed for fishing as well as wokas collecting (Barrett 1910:247-250).

The women divided their time at this season between the preparation of fish and the gathering of desert parsley roots towards the end of the main spring fish run. Desert parsley was available in April and May. This perennial, turnip-like tuber was found in the sagebrush scrub country. Its early appearance gave it a prominent position in the diet. The tubers were cooked, eaten fresh, or dried for the winter (Ray 1963:181, 198).

Procurement of Root Crops and Vegetal Foods

The Modoc moved to the digging grounds for epos [See Appendix A for a detailed listing of plant foods utilized by the Modoc] after the main sucker run was over in early to mid April. Epos was the most important plant food of the Modoc (Ray 1963:197; Powers 1877:256). It was gathered before blooming, usually in May, when the roots were soft and milky. The plants were found at upland elevations from 4,000 to 7,000 feet, in open places in the pine forests, in meadows, and on rocky slopes. The season was very short, only three or four weeks (Ray 1963:197-198).

The choicest village sites of this season were on streams or rivers where trout were available, within reach of good epos grounds. However, more importance was given to the proximity of epos, because of "the critical nature of the crop and

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because trout would be available until August (Ray 1963:181)."

In June or July, bulbs of the blue camas were dug in "moist meadows in the montane coniferous forests at elevations from 4,000 to 7,000 feet. The pattern of digging was much the same as for epos and the travel and logistic problems were similar. Most of the camas was kept for winter use....The season lasted for about a month, at the end of which time the roots accumulated by each woman were carried to her winter village home and cooked in an earth oven (Ray 1963:198)." Camas was rather scarce in Modoc territory and the population was at its most dispersed at this time, as people fanned out in search of it (Ray 1963:181).

In late July, white camas was ready for harvesting, soon after the blue camas season had ended. Collecting of white camas prolonged the root-digging season. The bulbs were gathered from moist, grassy places in the montane coniferous forests. Because white camas is poisonous in its raw state, leaching of toxic chemicals was accomplished by immersing sacks of the bulbs in a flowing stream for three days (Ray 196:199).

As the summer continued the water lily or wokas ripened on the marshes (Stern 1966:12). In the center of the wokas or water lily is a "pod resembling a poppy-head, full of rich farinaceous seeds. These were pulled in great quantities, and the seed thrashed out on the shore (Powers 1877:255)."

Seed collecting continued through September. Seeds were beaten from plants and collected in burden baskets. Among the more important were sunflower, buckwheat, willow dock, rye grass, plains mustard, lamb's-quarters, manna grass, blazing star, tarweed, balsam root, and water lily [wokas] (Ray 1963:182,199).

Fruits were also to be found in the mountains in the late summer and autumn. These were gathered in large quantities and dried for winter storage (Stern 1966:14). The most frequently collected species were the Sierra plum, twinberry, serviceberry, western chokecherry, blue elderberry, and strawberry (Ray 1963:200).

Twined baskets were used for a variety of food collecting activities. Large, flat parching and sifting trays, conical burden baskets, and large, flat, straight-walled storage baskets were common. A spoon-shaped basket was often used to harvest wokas. Seed beaters were used to exploit terrestrial seed-bearing plants. Metates and mullers, mortars and pestles, and conical mauls were employed to process roots, seeds, dried fish, and meat (Barrett 1910:252-255; Ray 1963:199).

Hunting Activities

Hunting, which occurred year round, became a central focus of activity in September when Modoc camps were moved to remote locations and higher elevations. The hunting season involved intensive activity until the snows came in December (Ray 1963:182). The favored hunting areas were in the east where large game was pursued. Collective drives only took place in the autumn, when deer and antelope were herded into enclosures (Stern 1966:14). Large game, such as, deer, elk, mountain sheep, antelope, grizzly bear, and black bear were hunted at the higher elevations. Smaller game including jackrabbits, groundhogs, beaver and waterfowl were also hunted by the Modoc (Ray 1963:181-189). [See Appendix B for a detailed listing of game foods pursued by the Modoc]

The bow and arrow was the primary implement used in hunting activities to bring down big and small game, as well as waterfowl. Dogs were used by individual hunters when stalking their prey. Cooperative drives involved the use of the chute and pound technique. Snowshoes were also worn by hunters to stalk game in snow covered areas and to capture rabbits (Ray 1963:185-189).

Thus, the Modoc's annual economic cycle involved movement in early March from lowland winter villages to fish camps along the rivers. With the ripening of roots in April and May, the Modoc moved into the montane regions to collect epos and camas. The mid-summer ripening of wokas on the marshes necessitated movement back to the lowlands in August, although some groups might find sufficient supplies of wokas around upland lakes and ponds. Seed and fruit collecting activities, and hunting, again took people to the higher elevations from late August through September. A great proportion of the Modoc's food resources were to be found in upland areas and a substantial amount of their time was spent in these areas acquiring important vegetal and meat resources. The coming of winter snows returned the Modoc to their permanent winter villages along lowland streams and lakes.

MODOC HOUSES AND VILLAGES

The Modoc had a variety of house forms. House groups usually consisted of related families (Ray 1963:157). During the winter, related families inhabited semi-subterranean earth lodges around the

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lakes and along the rivers (Ray 1963; Heizer and Whipple 1951; Stern 1966; Barrett 1910). The average depth of the lodges was four feet (one or two feet deeper than Klamath lodges). The diameter ranged from 16 to 40 feet and accomodated two to eight families, depending on size of the lodge. Large logs were used for the main structural supports and smaller logs were utilized in the framework and rafters. Roughly split planks or tule mats were placed over the framework and then a layer of earth was applied over the entire outer surface. The lodge was entered through a hatchway in the center of the roof (Ray 1963:147-153). Earth lodge villages were primarily located in the lowlands at permanent locations.

According to the ethnographic literature, the typical summer structure was a dome-shaped, mat covered hut (Ray 1963:146; Barrett 1910:244). The framework consisted of bent willow poles set into the ground to form a circular enclosure that was then covered with mats (Ray 1963:157). Summer structures were occupied as long as possible and portions of the framework were moved only when the specific economic season or local resource gave way to another (Ray 1963:181). A circular windbreak of interlocking sagebrush branches was a characteristic temporary shelter (Ray 1963:157). Summer structures and windbreaks were used in the uplands as well as in the lowlands.

CONCLUSION

The preceding ethnographic sketch constitutes a preliminary model for understanding the archaeological evidence found in the region of Gerber Reservoir. It is used in the present research as a basis for exploring the hypothesis that this upland region was used in prehistory for the procurement of food resources during the spring, summer and fall.

As the Gerber Reservoir research project continues the data reported in preliminary form below -- and further data to be garnered in additional research -- will be held up to this model as a basis for interpretation. It is anticipated that this research will considerably expand our currently limited conception of native utilization of the upland reaches of traditional Modoc territory.

PART II: ARCHAEOLOGICAL RESEARCH IN THE GERBER RESERVOIR AREA, JUNE - AUGUST 1987

EXCAVATIONS AT THE PENINSULA SITE JUNE - JULY 1987

Mapping and limited excavations were performed at the Peninsula Site (35 KL 87) by the University of Oregon Archaeological Fieldschool during the Summer of 1986 (Silvermoon n.d). The fieldschool returned in 1987 to conducted more comprehensive investigations of the stone rings at the site. Excavation units were placed within one ring to seek material that might provide direct information about the subsistence activities carried out at the site. It was also anticipated that these units would clarify questions regarding the superstructure of the stone rings. The following is a preliminary report of the second season's work.

Environmental Setting

Gerber reservoir is located in Klamath County, Oregon, (T. 39 S., R. 14 E.) at an elevation of approximately 4,800 feet. The reservoir was built in 1925 for flood control and irrigation water storage by the U.S. Bureau of Reclamation (Cannon 1985:2). Ben Hall, Barnes, Barnes Valley, and Wildhorse creeks supply water to the reservoir. Miller Creek feeds out of the reservoir and drains into Langell Valley to the west. Prior to construction of the dam and the flooding of the basin, Barnes, Barnes Valley, and Wildhorse creeks converged to form Miller creek in a wet meadow area in the eastern portion of the basin. Miller creek then flowed to the west where it was joined by Ben Hall creek, before it flowed out of the basin toward Langell Valley [See map 1].

The reservoir, 5 miles long by 2 miles wide, now covers what was once a large open basin, covered by an extensive wet meadow or marsh. Several small springs are located within the area (Cannon 1985:5). Several rocky knolls or nobs are found in the basin, as well as low rimrock along the edges. One of these rocky knolls can be seen today as an island in the reservoir, and as the water level recedes in the late summer other knolls become visible.

Annual precipitation is 14 inches on the average, with snow fall from October through April providing most of the precipitation. Summers are dry and warm, and winters are cool and humid. The temperature varies from below zero to above 90 degrees F. (Cannon 1985:5).

Local Vegetation

Vegetation around the reservoir is diversified. Juniper occurs with an understory of sagebrush, rabbit brush and grasses on the east side of the reservoir. Drainages that enter the basin contain meadow areas; these can be found for the most part on the north and south ends of the basin. Ponderosa pine occurs, with scattered juniper occur on the northern, southern, and western sides of the reservoir. Other vegetation in the area includes mountain mahogany, gooseberry, snowberry, bitterbrush, bluegrass, squirreltail, Idaho fescue, needlegrass, and bluebunch wheatgrass. Epos can also be found in the rocky flats that surround the basin. It is probable that camas grew on the floor of the basin in the meadow areas, as it is currently found in other nearby meadows (Cannon 1985:6).

Locally Available Game

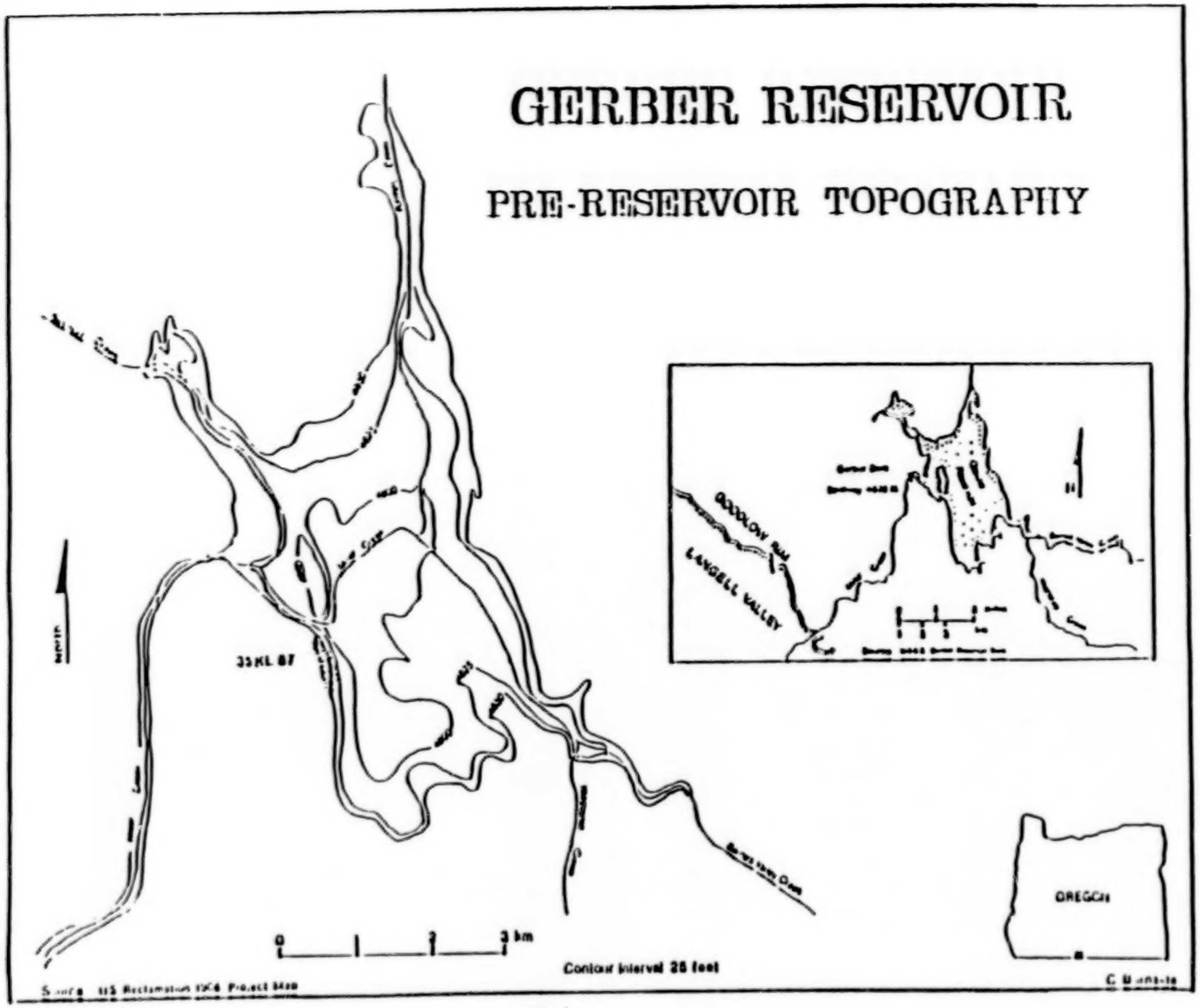
The California-Oregon interstate deer herds move through the area of the Gerber Reservoir during the spring and late fall (Steve Sherman, personal communication 1986). Elk can also be found in the higher elevations, 1.5 to 2 miles away, to the east of the reservoir. Waterfowl can currently be found on the reservoir and were present in the marshy meadowlands prior to construction of the dam. Fish and groundhogs were also found in the area of the reservoir prior to the construction of the dam (Orville De Vaul, personal communication 1986). Antelope are also commonly found in the area (Cannon 1985:6).

Archaeological Sites within the Basin

Fifteen prehistoric sites were located in the reservoir basin and along its edges during a systematic survey of the area in 1982 when the reservoir was dry. Areas previously inundated were surveyed to locate all potential cultural resources (Cannon 1985). Stone rings, rock art, and open lithic scatters were identified during the survey [See map 2].

EXCAVATIONS

During the summers of 1986 and 1987, archaeological investigations were conducted at the Peninsula Site, a large occupation area (35KL87) on the west side of the reservoir. The site lies near the tip of a peninsula that projects northward.



GERBER RESERVOIR

PRE-RESERVOIR TOPOGRAPHY

Contour interval 25 feet

Source U.S. Reclamation [illegible] Project Map

MAP 2

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Miller creek once flowed past the tip of the peninsula and formed a steep canyon between the peninsula and a large rocky knoll, that is now seen as an island in the reservoir. The Peninsula Site overlooks the basin, and occupants of the site would have had immediate access to the meadow resources and others that were to be found on nearby rocky flats and in the higher elevations [Map 1].

A scatter of artifacts and circular stone features, approximately 2000 feet long and 500 feet wide, delimits the extent of the site. Portions of the occupation are located in a sagebrush covered boulder field that is found west and north of the stone circles. The central portion of the site is located in ponderosa pine with its accompanying understory. The southern area is covered with mixed juniper and sagebrush on a flat, broad terrace.

A series of 29 circular stone rings identified at this site are suspected to be foundations for house superstructures. The stone rings range in diameter from 10 to 20 feet. Bedrock mortars and grinding surfaces occur nearby and support the idea that this was a habitation site. Two bedrock boulders incised with petroglyphs are situated near the center of the site. An almost continuous scatter of lithic flakes and tools covers the ground. The specimens include obsidian, basalt, cryptocrystalline silicates and some petrified wood.

1987 Excavations

Excavation continued at the Peninsula site (35 KL 87) in Ring 21, Feature 49. This ring is located near the center of the site. It was covered with serviceberry bushes and these were cleared out during the 1986 field season. After removal of brush and ponderosa pine needles, the circular alignment of basalt rocks was obvious. The decision was made to excavate approximately one-half of the ring. Two 1.5 x 3 meter units were put into the southern one-half of the ring. Excavation in each unit was by arbitrary 10 centimeter levels. A third unit, 1 x 1 meters, was later placed in the wall of the ring. An 1/8 inch screen was used for all sifting of fill excavated.

EXCAVATION UNITS

Grid 196S/255E

This unit, measuring 1.5 x 3 m, is situated in the southwestern portion of Ring 21. It was excavated to 40 centimeters below datum. Time constraints did not allow this unit to be excavated to sterile soil. Cultural material was still being recovered in quantity and it is believed that this unit would have continued to produce specimens to a depth comparable to that of unit Grid 196S/256.5E (below).

Level 1

Lithic debitage included 285 obsidian flakes, 14 basalt flakes, and 2 cryptocrystalline silicate (CCS) flakes. One piece of petrified wood was recovered. It had flake scars along one surface and showed use-wear on two edges. Twenty-two obsidian flakes with use-wear on one to three sides were also recovered. Two obsidian flakes exhibited flaking along one edge and this edge also showed use-wear. A chunk of CCS had use-wear along three edges, and a single CCS flake had use-wear along one edge.

One projectile point was found in this level; it was a small triangular obsidian point that was lacking a stem.

Six obsidian biface tips, interpreted as projectile point tips, were recovered. Also found was the mid-section of an obsidian biface, also believed to be part of a point.

Level 2

This level showed a significant increase in artifacts and debitage. There were 674 obsidian flakes recovered, as well as 47 basalt flakes and 10 CCS flakes. Seven pieces of petrified wood were recovered from this level. These pieces exhibited battered edges, use-wear, and flaking on their edges. Twenty-five obsidian flakes were recovered with use-wear on from one to three edges. Three obsidian flakes showed retouch on their edges and subsequent wear. One basalt flake showed retouch and utilization. An obsidian uniface had retouch on two edges and showed utilization on four edges. Also recovered was a CCS core with utilization, and a fragment of groundstone.

Four projectile points were recovered from this level. The first was an obsidian unifacially worked point with a stem. It is considered to fall within the range of variation found among Gunther points. The second point is a classic Gunther specimen of CCS. The third is stemmed and also falls within the range of Gunther points. The fourth point, of obsidian is of the Desert side-notched type.

A biface tip of obsidian was also recovered. It is believed to be the tip of a projectile point.

Level 3

The number of obsidian flakes decreased to 315. There were 12 basalt flakes and 14 CCS flakes. Two pieces of petrified wood have use-wear along one edge. Four basalt flakes had utilized edges. Fourteen obsidian flakes with utilized edges were found. An additional four obsidian flakes had at least one worked and utilized edge. One obsidian core with utilized edges was also recovered.

Two projectile points were recovered. One is an obsidian classic Gunther point. The other is an obsidian Rose Spring side-notched point.

Three possible projectile point tips occurred. Two are of obsidian and one is of CCS.

Level 4

In this last excavated level the obsidian flakes decreased to 266. Seven CCS flakes and 20 basalt flakes were found. Four pieces of petrified wood, two of which showed modification and use, were recovered. Nineteen utilized obsidian flakes were found, as well as 5 flakes with retouched edges and utilization. Also found was one CCS flake with use-wear. Three biface fragments were recovered; one an obsidian mid-section, another of obsidian that is just a fragment, and a CCS biface tip that is rounded on the tip.

One obsidian biface tip was found; it is believed to be the tip of a projectile point.

Grid 196S/256.5E

This unit was excavated to sterile soil. Although it was initially started as a 1.5 x 3 meter unit, it was reduced to a 1 x 1 m unit beginning with level 7. This change in unit size was to assure in the time available for excavation that sterile soil could be reached in at least one portion of the ring. Sterile deposits were reached at 100 cm below datum.

Level 1

One hundred and three obsidian flakes were recovered from this level. Of basalt there were 32 flakes and of CCS there were 4 flakes. One CCS nodule was recovered. Six pieces of petrified wood were recovered. One of these pieces showed possible utilization. There were 11 utilized obsidian flakes, and 5 utilized basalt flakes. Also found were 2 obsidian flakes that exhibited retouch and utilization.

Level 2

Obsidian flakes increased to 499 in this level. The amount of basalt flakes also increased to 61, as did the number of CCS flakes to 18. Six pieces of petrified wood were found, including one with retouch and utilization. Utilized flakes include 7 basalt, and 29 obsidian. There were also 9 obsidian flakes with worked edges and utilization. Two obsidian chunks showed utilization on their edges. An obsidian biface fragment was recovered. Also found was a CCS biface fragment with use-wear.

Four obsidian points were recovered from this level. Two are classic Gunther points. One less slassic, nevertheless falls within the range of Gunther points. The fourth is a Desert side-notched point.

Two point bases were also recoverd from this level. The first is a Desert side-notched base of obsidian. The second base is obsidian and triangular in shape.

The upper portion of a projectile point was also found. This point is of obsidian and the base is lacking.

Level 3

The number of obsidian flakes decreased to 235, as did the basalt to 30 and the CCS to 9. Four pieces of unmodified petrified wood were found. Two obsidian nodules were also found. There were 10 utilized obsidian flakes, as well as one obsidian chunk with utilized edges and 1 utilized basalt flake. Two obsidian flakes showed retouch and use-wear.

An obsidian point base was recovered from this level; it is triangular in shape.

A biface tip of obsidian is inferred to be the tip of a projectile point.

Level 4

Obsidian flakes continued to decrease to 169 flakes. Only 13 basalt and 10 CCS flakes were recovered. One piece of petrified wood was found. Utilized flakes include 2 basalt, 1 CCS, and 1 obsidian. One obsidian flake showed modification and edge wear. An obsidian uniface was found that was probably once part of a biface. Also found was the stem of an obsidian point.

Level 5

Only 76 obsidian flakes were found, along with 12 basalt and 12 CCS flakes. Four pieces of petrified wood were found and one piece exhibited utilization. Four obsidian flakes showed use-wear. One obsidian flake had retouched edges and use-wear. The mid-section of an obsidian biface was recovered. Its edges showed use-wear. An obsidian point stem also occurred in this level.

Level 6

The number of artifacts significantly decreased in this level. Only 29 obsidian flakes were recovered. Four basalt flakes were found, but there were not any CCS flakes found. Three utilized obsidian flakes were found, as was one basalt flake. One obsidian flake showed retouch and utilization.

Level 7

From level 7 downward, the size of the excavation unit was decreased from 1.5 x 3 m to 1 x 1 m, in order to assure that the bottom of the cultural deposit could be reached in the time available for excavation. Only 32 obsidian flakes were recovered. Two basalt flakes were found. Only 1 utilized obsidian flake occurred.

Level 8

In this level only 21 obsidian flakes were recovered, along with 2 basalt flakes. Three utilized obsidian flakes also were found.

Level 9

This level terminated in sterile soil. Sixteen obsidian flakes and 3 basalt flakes were recovered. The only utilized flakes were 2 of obsidian.

Level 10

This unit was lacking in all cultural material. Excavations were not continued below this level.

Grid 196S/258E

A 1 x 1 m unit was placed in the southeast wall of Ring 21. Total depth of the unit was 50 cm below datum. It was not excavated to sterile soil due to time constraints.

Level 1

A wide variety of material was recovered from this level. One hundred and forty-five obsidian flakes were recovered, as were 3 CCS and 19 basalt flakes. Two pieces of unmodified petrified wood were recovered. One obsidian nodule, and 1 CCS modified nodule were also found. Seven utilized obsidian flakes, 1 worked obsidian flake, and 1 obsidian chunk with utilized edges were found. Also recovered were 2 CCS flakes, one with retouch and utilization and one with just utilization. A possible obsidian point stem also occurred in this level.

A CCS point of classic Gunther style occurred in this level.

Level 2

Only 84 obsidian flakes occurred in this level. A utilized obsidian flake was also found. Ten basalt flakes and 8 CCS flakes were recovered.

Level 3

The number of obsidian flakes decreased to 54. Six basalt and 1 CCS flake were recovered. One basalt core was found. Three pieces of petrified wood, including one with flake scars and one utilized edge also occurred. One utilized obsidian flake, and one obsidian flake with retouch and utilization were also found.

Level 4

Obsidian flakes numbered 36. There were only 7 basalt and 2 CCS flakes. One CCS biface fragment with a utilized edge was found. Three utilized obsidian flakes, and one obsidian flake with modification and utilization were recovered. Two flakes with only retouch also occurred.

A probable Rose Spring side-notched point of obsidian was recovered in this level.

Level 5

Obsidian flakes increased slightly to 41. Only 6 basalt flakes were found. Four pieces of petrified wood, with one exhibiting possible utilization occurred. One chunk of CCS was found, and the only CCS flake found was utilized. Five obsidian flakes showed use-wear.

An obsidian biface tip was recovered; it is believed to be the tip of a projectile point.

Grid 122S/146E

A 1 x 1 m unit was situated in a cleared spot in the rocky, sagebrush covered flat to the west of the main portion of the site. It was decided that the number of surface artifacts warranted investigation. The unit, excavated to bedrock, was 40 cm deep.

Surface Collection

Twenty-seven obsidian, 4 basalt, and 4 CCS flakes were collected.

Level 1

Obsidian flakes were found to number 132. There 7 basalt and 7 CCS flakes. Five utilized obsidian flakes were recovered.

The only point recovered in this unit came from level 1. It is a crudely manufactured CCS point that falls within the broad range of Gunther points.

Level 2

Excavation revealed 100 obsidian flakes. Unfortunately the basalt and CCS flakes from levels 2 and 3 became combined in the lab. It is believed that 9 basalt and CCS flakes were recovered from this level. One basalt unifacial flake and 2 utilized obsidian flakes were recovered.

Level 3

Ninety-four obsidian flakes were recovered. It is believed that 8 basalt and CCS flakes came from this level.

Level 4

Obsidian flakes decreased to 32 and there was only 1 basalt flake. Two utilized obsidian flakes were found in this level.

SUMMARY AND PRELIMINARY INTERPRETATIONS

Ring 21 is a good example of the rock rings found at the Peninsula site. It is of average size (4.5 m in diameter) and the wall is well built. These rings are believed to represent the bases of pole-and-thatch houses. A bedrock hopper mortar located in an open space in the rock wall is considered to sit in the doorway of the structure. A hearth was not found within the southern half of Ring 21 that was excavated. It is hypothesized that a conical house superstructure was built upon poles footed in the earth and rocks of the ring wall, and leaned inward tipi-fashion. Post-holes found in unit 196S/258E were found between the rocks forming the wall of the ring. Excavation did not reveal any post-holes in the interior of the ring.

In the two large units (196S/255 & 256.5E) the greatest amount of material was recovered from level 2. The number of obsidian flakes increased greatly and there were also more tools and projectile points found in this level. Level 3 showed a decrease by almost one-half in the number of flakes recovered. This suggests that the occupation layer in the ring was concentrated within the upper 20 cm.

Unit 196S/158E was placed across the wall of the ring, incorporating some area both inside and outside of the ring. The greatest abundance of artifacts from the unit was found in level 1. There was a decrease in material in subsequent levels.

Projectile points recovered from Ring 21 can be classified as Gunther, Rose Spring, and Desert side-notched types. These point types are found to occur within the last 100 to 1300 years in Northern California (Gates and Sappington 1982:12).

Charcoal was found in concentrations within levels 3, 5, and 9 of unit 196S/256.5E in Ring 21. These concentrations were too formless to suggest fire hearths, but do probably represent cultural activities, because of their association with cultural material. Samples of charcoal from these three levels have been submitted for radiocarbon dating. The C-14 analysis should establish more precise occupation dates for the structure than are afforded by the comparative dates for its projectile points.

Unit 122S/146E is situated in the rocky sagebrush flat in the west part of the site. Level 1 contained the greatest amount of artifacts and the only projectile point from this unit. Levels 2 and 3 showed a decrease in artifacts, but had comparable amounts of artifacts. Level 4 exhibited a rapid decrease in artifacts and was situated immediately above sterile soil. This unit is interpreted as an area where flintknapping was the dominant activity.

EXCAVATIONS AT THE FROG HOLLOW SITE, JULY - AUGUST 1987

Environmental Setting of the Upper East Branch of the Lost River

The upper East Branch of the Lost River, is located in Klamath County, Oregon (T. 41 S., R. 14 1/2 E.) at an elevation that ranges from 4540 to 4749 ft. The area under consideration, within which the Frog Hollow site lies, is situated between Willow Valley Reservoir in the south and Duncan Spring in the north. Water from Duncan Spring flows to the south and provides enough water for a steady flowing stream. Portions of the stream have been closed off to cattle to form a riparian zone. The stream runs through a small canyon that was probably formed by faulting. Benches and terraces are dispersed along the canyon on either side of the drainage. Several small rockshelters are found along the drainage, but are in some instances difficult of access. Prior to construction of Willow Valley Reservoir the stream would have flowed through a meadow area at this location.

Annual precipitation would approximate that found in the vicinity of Gerber Reservoir (14 inches). The flow of Duncan Spring was considerable during the summer of 1987, when many other springs in the area were either dry or only producing a minimum flow.

Local Vegetation

Juniper is found widely dispersed on the bedrock flats above the drainage. Sego lily and epos were identified on the bedrock flats. Ponderosa pine are found within the drainage. Also found in the drainage are Sierra Plum, currants, chokecherry, nettle, serviceberry, yarrow, and snowberry.

Locally Available Game

The Interstate deer herds, as well as antelope are to be found in the area surrounding the East Branch of the Lost River. Groundhogs can be found within the drainage. Waterfowl are occasionally seen on the stream. Trout (possibly introduced), bullfrogs, crawfish, and chubs are found in the stream.

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Archaeological Sites in the East Branch Drainage

A survey of the upper east branch of the Lost River drainage during the summer of 1987 (report forthcoming) identified a wide variety of sites including lithic scatters, petroglyphs, stone rings, rock cairns, hunting blinds, and numerous isolated artifacts. The stone ring sites either overlooked the stream itself or were near springs. The petroglyphs were found on rock outcrops within the drainage.

EXCAVATIONS

Excavations were carried out at the Frog Hollow site during the 1987 Summer field season. The site (T. 41 S., R. 14 1/2 E. Sect. 8) is located on the west side of the East Branch of the Lost River, approximately one mile north of Willow Valley Reservoir. The site was chosen for excavation because numerous flaked stone artifacts and rock rings visible on the surface indicated its high information potential.

The site lies in a depressed area in a major bend in the East Branch drainage. It is located next to a broad, swampy area flanking the perenial stream that flows in the East Branch drainage. Cliffs bound the site on the north and south, with the southern cliff rising up higher than the northern cliff. The bed of an intermittent stream runs from the west through the site. It is probably filled only by spring runoff from the rocky flat to the west.

The site is covered with juniper and ponderosa trees. A variety of bushes also cover the site, including sagebrush, currants, snowberry, and serviceberry.

Twelve stone rings, ranging from 9 to 12 feet in diameter, were identified at the site. Only two of the rings exhibited evidence of digging by collectors. Because of this disturbance these rings were avoided during excavation. The rings are dispersed over the site and are not always recognizable. The slope of the site is great in some areas. Flat areas of the slope, if circular in shape, were closely examined to determine if rock rings were present. Three rings were found on the top of the southern cliff; two rings were located immediately below the northern cliff; four rings were clustered below the steepest portion of the southern cliff; two rings were identified on the northern edge of the southern cliff where its height was greatly decreased; and a disturbed ring was situated on the northern edge of a bench in the western part of the site.

A wide variety of artifacts were found on the surface of the site. These included groundstone fragments (mortars, manos, pestles, etc.), lithic debitage (obsidian, basalt, CCS, and petrified wood), projectile points, and utilized flakes. All groundstone materials were mapped and collected, as well as projectile points and any other identifiable tools.

All of the excavation units were 1 x 1 m, and screen size was 1/8 inch. A total of 16 units were excavated at the site. Eleven of these units were excavated into sterile soil.

Twelve of the excavation units were placed within four rings. These included six units in Ring 1, and two units each in Rings 4, 5, and 10. Ring 1 was excavated to a depth of 60 cm,where sterile soil was reached. Ring 4 was excavated to sterile soil after only 25 cm. Sterile soil was reached in Ring 5 after 55 cm. Ring 10 was the shallowest ring at the site and bedrock was found to lie only 16 cm below the surface.

The two bench areas were tested with two excavation units. Units on the lower bench were excavated to sterile soil which was reached between 70 and 80 cm. The units on the upper bench were not excavated to sterile soil. The deepest unit from the site and from this bench went to a depth of 130 cm. Excavation was terminated when time ran out.

Two hearths were identified at the Frog Hollow site. One large hearth was found near the center of Ring 1. A radiocarbon sample from this hearth is currently undergoing analysis. A second hearth attested by a baked clay lens, was identified in Ring 5. It was not as readily identifiable as the hearth in Ring 1, because little charcoal was recovered. A sample of charcoal found just outside this hearth is also undergoing radiocarbon analysis.

EXCAVATION UNITS

All of the excavated units have not yet undergone analysis. Ten of 16 excavation units have had their flaked stone materials analyzed. Tools and projectile points from the remaining six units have also been examined. The following inventories what has been found in selected ones.

Grid 10S/31E

Situated on the lower bench. It was excavated to sterile soil.

Surface Collection
-1 obsidian flake
-1 basalt flake
-1 utilized obsidian flake
-1 retouched obsidian flake

Level 1
-40 obsidian flakes (18 green)
-3 CCS flakes
-2 basalt flakes
-1 utilized obsidian flake
-1 obsidian biface fragment
-1 Rose Spring side-notched obsidian projectile point -1 obsidian biface tip

Level 2
-34 obsidian flakes (16 green)
-2 CCS flakes
-1 basalt flake

Level 3
-42 obsidian flakes (22 green)
-4 CCS flakes
-8 basalt flakes
-1 utilized obsidian flake

Level 4
-26 obsidian flakes (10 green)
-2 basalt flakes

Level 5
-31 obsidian flakes (16 green)
-1 CCS flake
-1 basalt flake
-1 utilized obsidian flake

Level 6
-18 obsidian flakes (2 green)
-1 CCS flake
-1 basalt flake

Level 7 - to sterile
-5 obsidian flakes (2 green)
-1 basalt flake

Grid 10S/33E

Located on the lower bench. It was excavated to sterile soil.

Surface Collection
-11 obsidian flakes (6 green)
-1 basalt hammerstone/core

Level 1
-50 obsidian flakes (18 green)
-7 CCS flakes
-2 basalt flakes
-1 CCS core
-3 utilized obsidian flakes

Level 2
-13 obsidian flakes (7 green)
-1 CCS flake
-1basalt flake
-1 piece of petrified wood

Level 3
-22 obsidian flakes (11 green)
-1 basalt flake
-2 CCS flakes
-1 obsidian Gunther projectile point with short tangs

Level 4
-32 obsidian flakes (11 green)
-6 CCS flakes
-5 basalt flakes

Level 5
-28 obsidian flakes (8 green)
-1 CCS flake
-3 basalt flakes
-1 utilized obsidian flake

Level 6
-14 obsidian flakes (6 green)
-2 CCS flakes
-1 basalt flake

Level 7
-17 obsidian flakes (3 green)
-3 CCS flakes

Level 8 - to sterile
-1 CCS flake
-1 basalt flake

Grid 13S/4E

Situated on the upper bench. Although this is the deepest unit in the site, it was not excavated to sterile soil.

Level 1
-52 obsidian flakes (14 green)
-1 CCS flake
-1 basalt flake
-2 utilized obsidian flakes

Level 2
-28 obsidian flakes (4 green)
-2 basalt flakes
-1 utilized basalt flake

Level 3
-76 obsidian flakes (32 green)
-4 CCS flakes
-3 basalt flakes
-2 green obsidian flakes with utilized edges

Level 4
-88 obsidian flakes (34 green)
-3 CCS flakes
-2 basalt flakes
-1 worked obsidian flake
-2 utilized obsidian flake

Level 5
-94 obsidian flakes (34 green)
-7 CCS flakes
-6 basalt flakes
-1 utilized obsidian flake
-1 worked obsidian flake
-2 utilized obsidian flakes (1 green)
-1 worked and utilized obsidian flake

Level 6
-59 obsidian flakes (13 green)
-6 CCS flakes
-11 basalt flakes
-1 utilized obsidian flake

Level 7
-90 obsidian flakes (19 green)
-4 CCS flakes
-9 basalt flakes
-1 utilized CCS flake

-2 utilized obsidian flake
-1 utilized basalt flake

Level 8
-87 obsidian flakes (15 green)
-5 CCS flakes
-13 basalt flakes
-3 utilized obsidian flakes (1 green)
-1 worked and utilized obsidian flake

Level 9
-109 obsidian flakes (24 green)
-6 CCS flakes
-17 basalt flakes
-2 utilized obsidian flakes (1 green)
-1 worked obsidian flake

Level 10
-91 obsidian flakes (22 green, 4 brown)
-1 CCS flake
-9 basalt flakes
-1 utilized green obsidian chunk
-1 worked and utilized obsidian flake

Level 11
-76 obsidian flakes (13 green, 13 brown)
-3 CCS flakes
-5 basalt flakes
-3 utilized obsidian flakes

Level 12
-65 obsidian flakes (11 green, 3 brown)
-1 CCS flake
-11 basalt flakes
-1 utilized green obsidian chunk

Level 13 - not to sterile.
-50 obsidian flakes (2 green, 1 brown)
-6 CCS flakes
-3 basalt flakes
-1 utilized green obsidian flake

Grid 14S/5E

Located on the upper bench. This unit was not excavated to sterile soil.

Level 1
-1 classic Gunther obsidian projectile point
-1 utilized obsidian flake

Level 3
-1 worked and utilized obsidian flake
-1 basalt hammerstone

Level 4
-1 obsidian biface mid-section, possibly from a point

Level 5
-1 utilized obsidian flake

Grid 23S/12W

Placed in Ring 4. Excavation terminated with sterile soil after 25 cm.

Level 1
-42 obsidian flakes (20 green, 1 brown)
-1 CCS flake
-1 basalt flake
-1 utilized CCS flake
-1 classic Gunther obsidian projectile point

Level 2
-15 obsidian flakes (9 green)
-1 CCS flake
-2 basalt flakes

Level 3 - Sterile, 5 cm.

Grid 24S/12W

Located in Ring 4. This unit terminated after 25 cm when sterile soil was encountered.

Level 1
-47 obsidian flakes (17 green, 8 brown)
-2 CCS flakes
-1 utilized obsidian flake
-1 crystal, probably from basalt
-1 obsidian Desert side-notched projectile point

Level 2
-21 obsidian flakes (4 green, 1 brown)
-2 basalt flakes
-2 utilized obsidian flakes
-1 green obsidian Rose Spring contracting stem point -1 bifacially worked obsidian flake

Level 3 - Sterile, 5 cm.

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Grid 32S/22E

Located in Ring 5, this unit was excavated to sterile soil.

Level 1
-1 obsidian Rose Spring corner-notched projectile point -1 obsidian Gunther projectile point

Level 3
-1 obsidian Gunther point with an expanding stem

Grid 33S/22E

Located in Ring 5, this unit was excavated to sterile soil.

Level 1
-1 green obsidian biface that does not resemble a point, but is comparable in size to Gunther points.

Level 2
-1 obsidian point of Gunther variation
-1 obsidian biface fragment

Grid 41S/32E

In Ring 1, this unit was excavated to sterile soil.

Level 1
-109 obsidian flakes (12 green)
-27 basalt flakes
-9 CCS flakes
-1 utilized basalt flake
-2 utilized obsidian flakes

Level 2
-91 obsidian flakes (14 green)
-3 CCS flakes
-11 basalt flakes
-1 utilized obsidian flake
-1 obsidian Rose Spring corner-notched projectile point

Level 3
-55 obsidian flakes (15 green)
-6 CCS faikes
-10 basalt flakes
-1 utilized basalt flake

Level 4
-24 obsidian flakes (9 green)
-3 CCS flakes
-8 basalt flakes
-3 utilized obsidian flakes

Level 5
-9 obsidian flakes
-1 CCS flake
-1 basalt flake

Grid 42S/31E

In Ring 1, this unit was not excavated to sterile soil.

Level 1
-1 utilized obsidian flake
-1 CCS biface fragment

Level 2
-1 basalt core/hammerstone
-1 utilized obsidian chunk

Level 3
-1 classic Gunther point of CCS

Level 4
-1 obsidian Gunther point with short tangs
-1 utilized green obsidian flake
-1 obsidian biface fragment with tip
-1 obsidian biface mid-section

Grid 43S/31E

In Ring 1, this unit was not excavated to sterile soil.

Level 6
-1 obsidian flake with bifacial retouch on one side and utiliazation

Grid 43S/32E

In Ring 1, this unit contained most of a hearth. The unit was not excavated to sterile soil.

Level 1
-1 obsidian biface mid-section

Level 2
-1 Obsidian point of Gunther variation with a parallel stem -1 utilized green obsidian flake

Level 3
-1 utilized obsidian flake
-1 utilized obsidian chunk
-1 CCS biface tip
-1 green obsidian biface
-1 green obsidian biface fragment
-1 obsidian biface tip

Level 4
-2 utilized obsidian flakes (1 green)
-1 green obsidian biface fragment
-3 obsidian biface tips (1 green)
-1 worked and utilized green obsidian flake

Grid 43S/33E

Located in Ring 1, this unit was excavated to sterile soil.

Level 1
-33 obsidian flakes
-1 CCS flake
-2 utilized obsidian flakes

Level 2
-64 obsidian flakes
-6 CCS flakes
-10 basalt flakes

Level 3
-44 obsidian flakes
-3 CCS flakes
-2 basalt flakes
-1 utilized obsidian flake

Level 4
-29 obsidian flakes
-5 CCS flakes
-14 basalt flakes
-1 utilized obsidian flake
-1 utilized basalt flake

Level 5
-35 obsidian flakes
-2 CCS flakes
-19 basalt flakes
-1 utilized obsidian flake

Level 6 - to sterile
-1 obsidian flake

Grid 44S/32E

Located in Ring 1, this unit was excavated to sterile soil.

Surface Collection
-1 basalt flake

Level 1
-14 obsidian flakes
-5 basalt flakes
-1 CCS nodule/core
-1 utilized obsidian flake

Level 2
-24 obsidian flakes (6 green)
-4 CCS flakes
-3 basalt flakes
-1 obsidian Gunther point with short tangs

Level 3
-25 obsidian flakes (5 green)
-5 CCS flakes
-3 basalt flakes
-5 utilized obsidian flakes (1 green)

Level 4
-13 obsidian flakes (6 green)
-2 CCS flakes
-14 obsidian flakes
-3 utilized obsidian flakes

Level 5
-15 obsidian flakes (4 green)
-4 CCS flakes
-7 basalt flakes
-2 utilized obsidian flakes

Level 6 - to sterile
-6 obsidian flakes (2 green)

Grid Flat Top I

Situated above the southern rimrock, this unit was excavated down to bedrock.

Level 1

-43 obsidian flakes
-5 basalt flakes
-2 CCS flakes

Level 2
-3 obsidian flakes
-1 utilized obsidian flake

Grid Flat Top II

Located above the southern rimrock, this unit was excavated down to bedrock.

Surface Collection
-1 basalt flake

Level 1
-23 obsidian flakes
-4 CCS flakes
-3 basalt flakes

Level 2
-4 obsidian flakes

SUMMARY AND PRELIMINARY INTERPRETATION

Although analysis of the evidence from Frog hollow is not yet complete it is possible to make some broad generalizations about the site. The stone rings at this site contained artifacts that led us to conclude that they were houses. A wide variety of tools and lithic debitage were recovered from within these rings. Two rings also contained hearths. The hearth in Ring 1 yielded large amounts of charcoal. The hearth in Ring 5 showed up as a baked clay lens in the wall profile. Charcoal was not recovered from within this feature.

Occupation in Ring 4 was primarily concentrated in level 1. The excavations in Ring 1 show that the majority of cultural material there was contained within levels 1, 2, and 3. However points and tools continued to occur in lower levels. Ring 10, located above the basalt rimrock to the south of the site, was very shallow (16 cm in depth). Most of the cultural material was concentrated in Level 1, within the first 10 cm of deposit. Level 2, excavated down to bedrock, had greatly reduced amounts of artifacts.

Rings 1, 4, and 5 all contained projectile points. These included Gunther, Rose Spring, and Desert side-notched points. All of these types are found to occur between 1300 and 100 years ago in the Oregon-California border region (Gates and Sappington 1982:12). Ring 10 did not have any points or other diagnostic artifacts in it, making it difficult to date. Excavations on the lower bench also revealed comparable points to those found in the rock rings. One Gunther point was recovered from level 1 of one of the excavation on the upper bench.

Radiocarbon samples from one hearth in Ring 1 and from the vicinity of a hearth in Ring 5 are currently undergoing analysis. These assays should help to date the site more precisely then is possible based on artifact type comparisons alone.

CONCLUDING STATEMENT

The Peninsula and Frog Hollow sites have yielded valuable information regarding the use of upland (above 4000 ft) areas within the ethnographic Modoc territory. These habitation sites indicate that people appear to have occupied the area for a considerable length of time during the spring, summer and fall. The stone rings found at each site, and at others in the area, can quite probably be viewed as house structures. The richness of cultural material in the stone rings, usually 30 cm, indicates that these were not ephemeral occupations.

A wide variety of tools were found at each of these sites, indicating once again that occupation was for a considerable length of time. At the Peninsula Site all tools were found within the excavated house ring. At Frog Hollow the majority of tools found were from within the excavated rings. Projectile points at both sites fall into a time period that ranges from 100 to 1300 years ago.

Organic material recovered from both sites has not yet been analyzed, but cursory examination of the collected specimens shows that roots, seeds, fish, and freshwater mussels were utilized at the Peninsula site. The Frog Hollow site has not yielded much in the way of organic material, so it is more difficult to discuss subsistence activities at this site. However, bedrock hopper mortars were found here, as well as fragments of portable mortars, so it does appear that vegetal foods were being processed.

Many resources are available within a short distance of both of these sites. It is not unreasonable to infer that the prehistoric occupants, upon removing to this locality from settled lowland winter villages, would also choose to stay in one location -- were it possible -- for a considerable period of time during the spring, summer, and fall. If most of the resources collected and hunted in this upland area were within easy walking distance of a suitable site, it would be more efficient to send out task groups from a central settlement to collect these resources than to keep moving the entire social group from resource to resource.

It is evident that continuing archaeological investigations in the Gerber Reservoir Quadrangle will contribute to a better understanding of aboriginal use of this area. Survey and excavations already carried out indicate that the area was used substantially in prehistory. The stone ring sites amplify existing ethnographic evidence for the native house types used in the uplands. Continuing archaeological research will further expand our knowledge of aboriginal culture in this area enabling us not only to characterize Native American occupation patterns, but also to establish their depth in time. Ongoing work will detail the excavations and artifactual remains much more fully than has been possible in this interim report, and explore their meanings much more fully.

REFERENCES CITED

Barrett, S.A.

1910 The Material Culture of the Klamath Lake and Modoc Indians of Northern California and Oregon. University of California Publications in American Archaeology and Ethnology, 5(4):239-293.

Burnside, Carla D.

1987 "Environmental and Ethnographic Background to Archaeological Research in the Gerber Reservoir, Klamath County, Oregon: The problem of Upland Occuaption, Mobility, and Sedentism." Masters' Paper, Department of Anthropology, University of Oregon.

Cannon, William.

1984 Cultural Resources Survey of Gerber Reservoir. Lakeview District, BLM.

1985 Gerber Reservoir: Cultural Resource Management Plan. Lakeview District, BLM.

De Vaul, Orville

1986 "Tape-recorded interview on the environment of the Gerbe Reservoir basin prior to construction of the dam, at Gerber Reservoir, August 1986." Transcript on File at the Oregon State Museum of Anthropology University Oregon.

Gates, Gerald R., and Robert L. Sappington

1982 "Preliminary Report on Obsidian Sourcing, Chronology, and Trade Patterns in Modoc County." Paper presented at the 1982 Annual Meeting of the Society for California Archaeology, Sacramento, California.

Heizer, Robert F.

1966 Languages, Territories, and Names of California Indian Tribes. University of California Press, Berkeley.

Heizer, Robert F., and M.A. Whipple

1951 The California Indians: A Source Book. University of California Press, Berkeley.

Jorgensen, Joseph G.

1980 Western Indians. W.H. Freeman and Company, San Francisco.

Powers, Stephen

1877 *Contributions to North American Ethnology, Vol.III.* Dept. of the Interior. U.S. Geographical Survey of the Rocky Mountain Region. Washington: Govt. Printing Office.

Ray, Verne F.

1963 *Primitive Pragmatists: The Modoc Indians of Northern California.* University of Washington Press, Seattle.

Sherman, Steve

1986 Personal Communication. District Manager, Klamath Falls BLM.

Silvermoon, Jon

n.d. Archaeological Investigations at the Peninsula Site, (35 KL 87) Gerber Reservoir. In progress.

Spier, Leslie

1930 Klamath Ethnology. *University of California Publications in American Archaeology and Ethnology, Vol. XXX.* University of California Press, Berkeley.

Stern, Theodore

1966 *The Klamath Tribe: A People and their Reservation.* University of Washington Press, Seattle.

APPENDIX A
Food Plants of the Modoc
(From Ray 1963)

English Common Names, Modoc Names, and English Binomials

Amaranth (ba ˉma?)	*Amaranthus blitoides*
Arrowhead (tcewa ˊq)	*Sagittaria cuneata*
Aspen, quaking	*Populus tremuloides*
Balsamroot, arrow-leaved (lba ˉ)	*Balsamorhiza sagittata*
Barberry (bacawe ˊsam)	*Berberis repens*
Bearberry (kaimcama ˉl)	*Arctostaphylos Uva-ursi*
Bilberry (qala ˉtc)	*Vaccinium arbuscula*
Blackberry (tocama ˊsam)	*Rubus macropetalus*
Blackcap (ma ˊ[illegible])	*Rubus leucodermis*
Blazing star (lo ˉlas)	*Mentzelia albicaulis*
Blueberry (l ˊwam)	*Vaccinium arbuscula*
Blueberry, western (l ˊwam)	*Vaccinium occidentale*
Buckbrush (dta ˉkala)	*Ceanothus sanguineus*
Buckwheat (qa ˉlapca)	*Eriogonum umbellatum*
Bur reed (po ˊdtcaq)	*Sparganium eurycarpum*
Buttercup (ye ˊnamnado)	*Ranunculus occidentalis*
Camas (bo ˉke)	*Camassia quamash*
"Camas, white" (sqa ˊo)	*Zygadenus venenosis*
Caraway, Oregon false (qa ˊs)	*Carum oreganum*
Caraway, western false (nda ˉlc)	*Carum Gairdneri*
Cascara	*Rhamnus Purshiana*
Cattail (pu ˊpos am; kta ˊqs [root])	*Typha latifolia*
Cedar, incense (wolwa ˊac)	*Libocedrus decurrens*
Cherry, bitter (dawitcqa ˊs?)	*Prunus emarginata*
Chokecherry, western (dawitcqa ˊs)	*Prunus virginiana*
Currant, flowering (tcα ˊmtcaq)	*Ribes aureum*
Currant, squaw (tcmao ˉlaq)	*Ribes cereum*
Dock (go ˉkca)	*Rumex lacustris*
Dock, western (go ˉkca)	*Rumex occidentalis*
Dock, willow (go ˉkca)	*Rumex salicifolius*
Elderberry, blue (cla ˉlas am; sapa ˊwal?)	*Sambucus coerulea*
Epos (qa ˊs; ndalk)	*Carum Gairdneri; C. oreganum*
Fir, white (cakca ˉlkis; ci ˊpkis?)	*Abies concolor*
Flax (qo ˉlaxamaps)	*Linum perenne*
Grass, arrow (gile ˊna)	*Triglochin maritima*
Grass, manna (kamtcoca ˉlis)	*Glyceria occidentalis*
Grass, rye (gla ˊpu)	*Elymus triticoides*
Grass, spike bent (no ˊtaq)	*Agrostis exarata*
Grass, tickle (no ˊtaq)	*Agrostis scabra*
Goosefoot (kotca ˊnaks)	*Chenopodium Fremontii*
Hemlock, water (kawa ˊnks)	*Cicuta Douglasii*
Hemp, indian (no ˊd)	*Apocynum cannabinum*
Horsetail (wa ˊtmq)	*Equisetum hiemale*
Huckleberry, mountain (l ˊwam)	*Vaccinium membranaceum*
Huckleberry, western (l ˊwam)	*Vaccinium occidentale*
Iris (qa ˊqoqloqo ˊ)	*Iris missouriensis; I. tenax*
Juniper, western (qa ˉlu)	*Juniperus occidentalis*
Kinnikinnick (kemcma ˊl?)	*Arctostaphylos Uva-ursi*
Knotweed (ka ˊplonks)	*Polygonum Douglasii*
Lamb's-quarters (kotca ˊnaks)	*Chenopodium Fremontii*
Lichen, black (qa ˉl)	*Alectoria Fremontii*
Lichen, yellow (ga ˊda)	*Evernia vulpina*
Lily, sego (yα ˊac)	*Calochortus macrocarpus*
Lily, water (wo ˊqas)	*Nuphar polysepalum*
Mahogany, mountain (yomca ˉcam)	*Cercocarpus ledifolius*
Manzanita, pinemat (patca ˉl?)	*Arctostaphylos nevadensis*
Mint, Canada (matca ˊsam)	*Mentha canadensis*
Mint, woolly field (lulα ˊt)	*Mentha arvensis*
Mustard, plains (tci ˊpas)	*Sisymbrium linifolium*
Mustard, tansy (tci ˊpas)	*Descurainia pinnata*
Mule's ears	*Wyethia amplexicaulis*
Nettle, hoary (cle ˊdz)	*Urtica holosericea*
Nettle, Sierra (cle ˊdz)	*Urtica serra*
Oregon grape (balbale ˊnam?)	*Berberis Aquifolium*
Parsley, desert (le ˊxas)	*Lomatium Canbyi*
Parsnip, cow (ba ˉtca)	*Heracleum lanatum*
Parsnip, hemlock water (qa ˊnas am)	*Sium suave*
Pine, lodgepole (wa ˊqu)	*Pinus Murrayana*
Pine, sugar (kta ˉlo)	*Pinus Lambertiana*
Pine, yellow (lala ˊgo)	*Pinus ponderosa*
Plum, Sierra (tumα ˉlo)	*Prunus subcordata*
Poplar, balsam (ko ˊoc)	*Populus balsamifera*
Rabbit brush	*Chrysothamnus nauseosus*
Rattlesnake weed (mα ˊs)	*Daucus pusillus*
Reed, common (tca ˉl)	*Phragmites communis*
Rose, wild (tcewi ˊdl)	*Rosa californica; R. Woodsii*
Rush (qoda ˉls am; tci ˊnan)	*Juncus balticus*
Sagebrush (cqo ˊt; bu ˉlswi)	*Artemisia tridentata*
Sedge (be ˊal)	*Carex*
Serviceberry (tcα ˊq)	*Amelanchier alnifolia*
Slough grass (tca ˊpto)	*Beckmannia Syzigachne*
Sorrel (go ˉkca)	*Rumex lacustris*
Spikenard (ba ˊwas)	*Aralia californica*
Strawberry (qoqatcqatcale ˊnam; dta ˊwida ˉcs)	*Fragaria platypetala*
Sunflower (bα ˊndaq; lata ˉlam)	*Helianthus Cusickii; H. Nuttallii*
Tarweed (go ˊewa)	*Madia glomerata*
Tetradymia, gray (qeqe ˊbetsam)	*Tetradymia canescens*
Thornwood (la ˉ)	*Lycium Andersonii*
Tobacco (qatkla ˊm)	*Nicotiana attenuata*
Tobacco root (ko ˉl)	*Valeriana obovata*
Tule (ma ˉl; kla ˊma?)	*Scirpus acutus*
Tulip, star	*Calochortus uniflorus*
Twinberry (o ˊtam)	*Lonicera involucrata*
Twinberry, siamese (o ˊtam)	*Lonicera conjugialis*
Wapato (tcewa ˊq)	*Sagittaria latifolia*
Willow (ya ˊc)	*Salix*
Willow, red (tcu ˊa)	*Salix lasiandra*
Yarrow (la ˉlualsam)	*Achillea borealis*
Yew, western (tsooi ˊnasam)	*Taxus brevifolia*
Zygadene (sqa ˊo)	*Zygadenus venenosis*

APPENDIX B

Principal Plant and Animal Foods of the Modoc
(From Ray 1963)

Roots: arrowhead; bur reed; camas; "white camas" (after leaching); false caraway; cattail; epos; sego lily; desert parsley; sedge; spikenard; tobacco root; tule; star tulip; wapato.

Seeds: amaranth; balsamroot; blazing star; buckwheat; cattail; dock; goosefoot; grasses (arrow, rye, spike bent, tickle); knotweed; lamb's-quarters; water lily; plains mustard; tansy mustard; desert parsley; lodgepole pine; sugar pine; common reed; rush; slough grass; sorrel; sunflower; tarweed; yarrow.

Fruits: bilberry; blackberry; blackcap; bitter cherry; chokecherry; flowering currant; squaw currant; blue elderberry; mountain huckleberry; western huckleberry; pinemat manzanita; Sierra plum; wild rose; serviceberry; strawberry; twinberry; siamese twinberry.

Stems and shoots: bur reed; cattail; cow parsnip; dock; rush; sedge; tule.

Lichen and bark: black lichen; yellow lichen; lodgepole pine cambium layer; yellow pine inner bark; also, tetradymia root bark as a "chewing gum."

Leaves: hemlock water parsnip.

Land game: antelope; badger; black bear; grizzly bear; beaver; bobcat; chipmunk; cougar; coyote; blacktailed deer; whitetailed deer; mule deer; elk; fisher; gray fox; silver fox; lynx; mink; otter; porcupine; cottontail rabbit; jack rabbit; snowshoe rabbit; raccoon; mountain sheep; skunk; flying squirrel; pine squirrel; timber wolf; woodchuck (ground hog).

Fowl: brant (several species); crane (several species); curlew; duck (several species); goose; gull; loon; mudhen; pelican; prairie chicken; quail; sage hen; swan.

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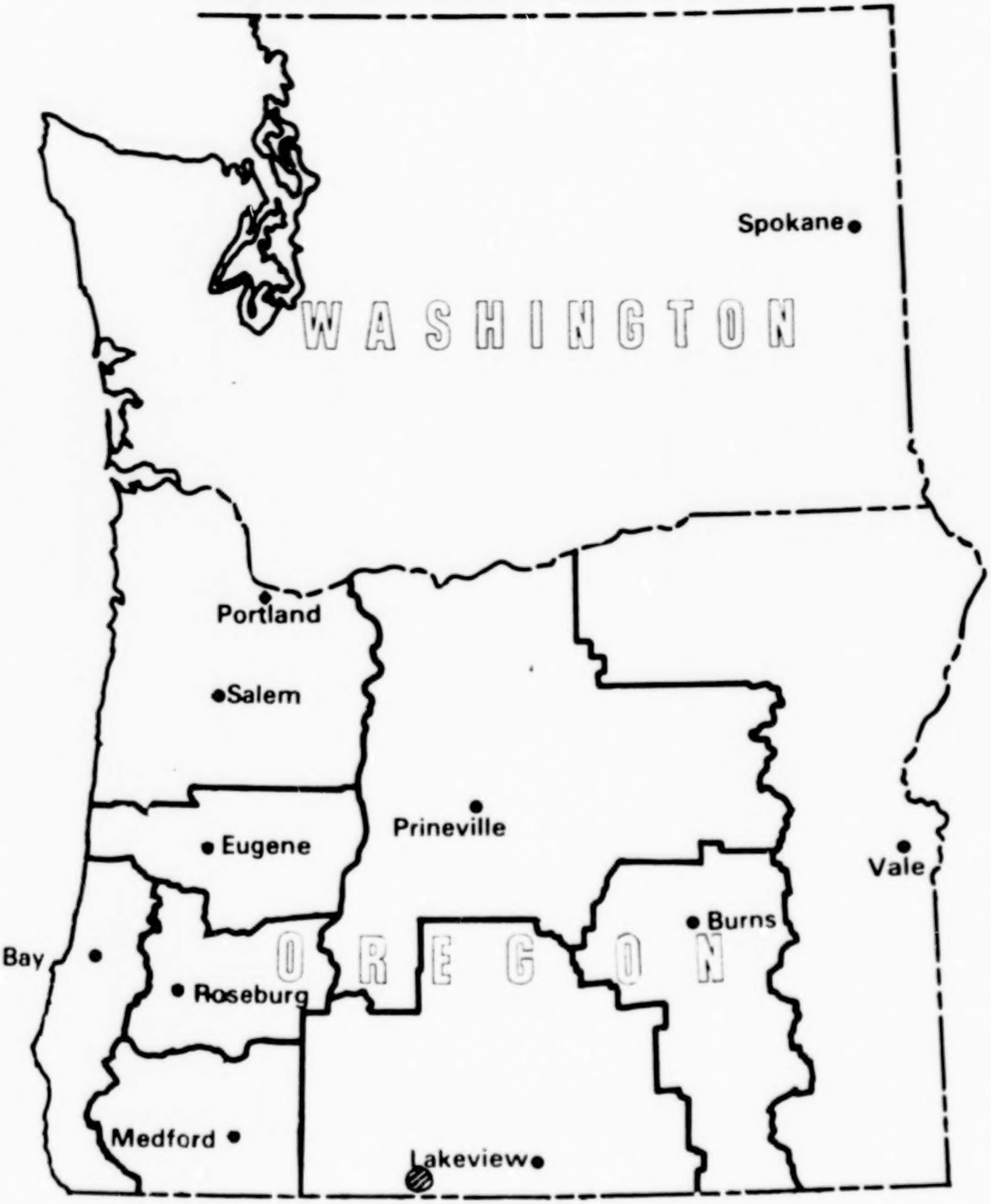

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